MAMMALS OF BOLIVIA, TAXONOMY AND DISTRIBUTION

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ABSTRACT

Studies of published records and of about 36,900 specimens of native mammals from Bolivia reveal that at least 327 species occur there. Probably more than 20 other species, either new to science or new to Bolivia, remain to be discovered. In addition to these species names, some 44 additional subspecies names are used. Most of the subspecies names reflect taxonomic history more than detailed knowledge of geographic variation. In this report, the taxonomic status of each taxon within Bolivia is noted. Scientific names that have been used for Bolivian specimens are given for each species and subspecies, and all known publications that have specifically referred to Bolivian specimens are cited, along with a few other works selected for special reasons. Specimens are listed, and localities are mapped, including the prediction of the probable distribution of each species within Bolivia. Illustrated keys are based primarily on external, cranial, and dental characters and include 10 domestic and introduced species in addition to native species. The number of species present in most local areas ranges from about 50 to 180. Analysis indicates four major faunal areas: lowland tropics, lowland temperate zone (including the chacoan area), forested yungas, and highlands (altiplano). The highland and lowland faunas are almost mutually exclusive; the break between temperate and tropical is indistinct.

INTRODUCTION

This work is dedicated to the hypothesis-testers of this world. Everything concluded here is subject to further testing. I expect much of this information to be substantiated, but not everything.

Bolivia is a country of amazing biological diversity, with faunal and floral richness arising from its geographic location in the center of South America and its great topographic range. Its position at the juncture of the tropical and temperate zones has allowed the Bolivian area to draw from and contribute to the faunal complements of those zones over millions of years of evolution as well as over the shorter time span of ecological changes in the last 10,000 years. The task of disentangling the effects of these long- and short-term processes makes biogeography both difficult and fascinating.

The uplifting of the high Andes, resulting from the collision of two tectonic plates in the earth's crust in the last 10 to 15 million years, is a relatively recent event in the long sweep of geological time (Roeder, 1988). Some of the changes and their possible effects on the eventual development of present-day savannahs in Beni were presented by Hanagarth (1993).

Most of what is known of fossil mammals in Bolivia relates to pre-Pleistocene time and an earlier fauna. There are later deposits near Tarija (Ameghino, 1902; Boule and Thevenin, 1920; Hoffstetter, 1963). For other information see MacFadden et al. (1985, 1994), Hoffstetter (1986), Marshall (1987), Marshall and Muizon (1988), and Janis (1993).

Although the details of changes in local climates and vegetation occurring over longer periods are poorly known, we can safely conclude that the relative extents of different habitats have fluctuated. At a given time, tropical forests might be continuous and widespread and enclose smaller and more dispersed areas of grassland, savanna, or other habitats. At other times, tropical forests might be reduced to smaller dispersed patches (see Patton et al., 1990, for a discussion of vicariant versus gradient models of faunal evolution in the Andean region).

The organization of this faunal report is similar to that of an earlier report on the mammals of Chihuahua, Mexico (Anderson, 1972). The theoretical and practical advantages and disadvantages of faunal studies that I discussed there apply with equal or greater force to the present situation.

Bolivia and Chihuahua are similar in several respects. The southwestern part of each is of greater elevation than other parts. A coastline lies to the west of both, but is separated by a relatively narrow belt in another political division with a largely different habitat. However, the size of Chihuahua is only about 23% the size of Bolivia. In 1972, 6600 Chihuahuan specimens were available for study. This quantity is equal only to about 18% the 36,900 available for study in Bolivia in 1994. And yet, the stage of development of taxonomic knowledge for Bolivia was not as advanced in 1994 as it was for Chihuahua in 1972. In some ways the taxonomy for Bolivian mammals is comparable in development to that of western North America at about the beginning of the 20th century, before the publication of revisions for such widespread, common, and diverse genera as *Microtus* (Bailey, 1900), *Perognathus* (Osgood, 1900), and *Peromyscus* (Osgood, 1909). See also discussions of taxonomic comparability of the continents by Mares (*in* Mares and Genoways, 1982: 11) and by Pine (op. cit.: 27). Most of the abundant and diverse South American genera, such as *Akodon*, *Proechimys*, *Oligoryzomys*, and *Oryzomys*, as well as rarer genera, such as *Thomasomys* and *Rhipidomys*, need critical and comprehensive revisions at the level of species and subspecies. These revisions can provide basic data needed for analyses of relationships at intermediate and higher taxonomic levels. I have found time to deal with only a few of these problems and have done what I could to encourage and expedite the work of others on these taxa, although it is frustrating, in a way, to leave so many of them unresolved. This is very much a work in progress, not the final word on taxonomy and distribution of Bolivian mammals.

During the years since 1980, when I began intensive work on this manuscript, taxonomic advances changed our understanding of Bolivian taxonomy sufficiently to cast doubt on some identifications made in earlier years. I have not been able to restudy all of these specimens, or I was uncertain of their identities the first time I studied them, and so have listed them as unknown species under the appropriate genus. Some unidentified specimens are known to exist but I have not examined them; others are incomplete or otherwise difficult or impossible to identify as to species. I hope that listing these 1293 specimens (about 3.5%) will bring unsolved problems to the attention of future students and expedite their finding relevant material. I should note, also, that my research notes (on some 10,000 5 by 8-in. cards, with museum catalog numbers and other data) are available in the archives of the Department of Mammalogy and may be consulted there.

The mammalian fauna of South America, in general, has been studied less intensively than that of North America, as noted above. The major faunal summary for South American mammals is still the annotated checklist by Cabrera (1958, 1961a). Regional or national accounts are few. Books on Suriname (Husson, 1978) and Chile (Osgood, 1943) are the only detailed recent accounts of an entire national mammalian fauna. A summary of the literature for Peru published by Soukup (1960–1961) and a booklet for Argentina by Olrog and Lucero (1981) in "field guide" format, with general range maps and illustrations but without supporting documentation, are examples of what has been available. Recently published popular accounts on the living mammals of the nearby provinces of Salta and Tucumán in Argentina (Mares et al., 1989; Barquez et al., 1991) and on the mammals of tropical and southern regions (Emmons and Feer, 1990; Redford and Eisenberg, 1992) have contributed to knowledge of South American mammals.

At the request of Bolivian colleagues, a list of scientific names of Bolivian mammals was published in Bolivia to provide a working preliminary summary (Anderson, 1985b), as well as lists of selected large mammals in parks and reserves (Cardozo et al., 1988). An annotated list, with information on general geographic distribution within Bolivia for each species and with illustrated keys to Bolivian mammals was prepared in 1987 for publication in Spanish and was published later (Anderson, 1993). These lists provided a comparative basis for a series of short reports of additional distributional records (Yensen and Tarifa, 1993; Ibáñez et al.,1994; Salazar et al., 1994; Yensen et al., 1994) and a more comprehensive discussion of biogeography (Salazar et al., in press).

A number of shorter technical reports on taxonomy and distribution have been produced in the course of the larger faunal study. These are cited in the appropriate species accounts.

Since collecting by field parties from the American Museum of Natural History resumed in 1963 (after earlier work in 1915, 1926, and 1929), we have made specimens and information from our work available to qualified scholars. These materials have been used in various studies (e.g., Hershkovitz, 1966; Davis, 1973, 1976; Eger, 1977).

During the years of preparation of this report, draft copies of various sections or specially extracted summaries of data (e.g., on the mammals of Chuquisaca, Tarija, Pando, Beni, the Cochabamba Valley, the yungas of La Paz, the altiplano, Rodentia, Chiroptera, certain genera, etc.) have been provided to Bolivian institutions and to investigators there and elsewhere. These institutions include Colección Boliviana de Fauna (formed by combining the collections of the Instituto de Ecología and the Museo Nacional de Historia Natural), Centro de Datos para la Conservación, Instituto Boliviano de Biología de Altura (all in La Paz), and Centro Nacional de Enfermidades Tropicales and Parque Zoologico de Fauna Sud Americana (in Santa Cruz). Information on Bolivian bats was published (Anderson et al., 1982) and later brought up to date by Anderson and Webster (1983) and by Anderson (1991).

In some cases, catalog numbers are also given in lists or in text where changes of identification have occurred or specimens from one presumed series have been subsequently placed in more than one taxon. Future workers may need to know exactly which specimens are involved.

ACKNOWLEDGMENTS

Before his death in 1953, G. H. H. Tate began to write an account of "the living land mammals of Latin America and the West Indies." He did not complete the work. A copy in the archives of the Department of Mammalogy provided some ideas on what might be useful in the introductory remarks for various taxa.

Each of the many authors whose works are cited below has contributed to this report, as have the many field collectors listed in the sections on history, each to a greater or lesser degree. Many small contributions, in the aggregate, amount to a significant part of the total body of knowledge compiled and synthesized here. The curators and other persons responsible for all the collections cited have been most helpful. I am grateful to Dr. Leslie Marcus for extracting data from my computer files and then preparing the final distribution maps with a computer. Walter de Gruyter and Co. granted permission to quote from Koopman (1994) on bats. Dr. Kurt Bauer of Vienna, Austria, sent information on the journey of J. Natterer in 1829. Nobuko E. Pine translated pertinent parts of a number of Japanese articles.

My wife, friend, field assistant, and photographer, R. Justine Anderson, helped throughout this protracted project. Ted Danforth volunteered to prepare the initial draft of the gazetteer. The late Marie Lawrence was of great help in bibliographic matters. Nancy Olds collaborated in the lab and the field, and as an Exxon Fellow obtained and compiled many of the measurements for tables. Muriel V. Williams provided highly competent secretarial services, including numerous reshufflings and revisions of computer files. A host of students and other volunteers have assisted in the lab in ways too numerous to mention. In addition to essential and important support for curatorial, technical, secretarial, administrative, and library services, the American Museum of Natural History provided direct financial support for fieldwork and travel to study other collections through the Koopman Taxonomic Mammalogy Fund and the Bolivian Expeditions Fund.

Fieldwork in 1964 and 1965 was supported in part by the U.S. Army Medical Research and Development Command through grant number DA-MD-49-193-63-G82. The principal purpose was to conduct a survey of mammals and their ectoparasites, but many other vertebrates and arthropods were collected as well.

Collaborative fieldwork in most of the years from 1985 to 1993 was supported in part by grants from the National Science Foundation to the American Museum of Natural History, the University of New Mexico, and the University of California at Davis, including the following: BSR-83-16740, BSR-84-08923, BSR-86-12329, BSR-89-20617, BSR-90-24816, and INT-92-12839. Another grant was received from the National Institutes of Health (DRR-RR08139). Graduate students working with us obtained grants, largely on their own initiatives, from the

American Society of Mammalogists, Sigma Xi, the Hayward Foundation, and the Tinker Foundation and the Mellon Foundation (via the Latin American Institute of the University of New Mexico). Semifinal drafts of this paper were reviewed by David M. Armstrong, Janet K. Braun, Karl F. Koopman, Michael A. Mares, Bruce D. Patterson, James L. Patton, Ronald H. Pine, Jorge Salazar B., and Terry L. Yates.

OBJECTIVES AND ORGANIZATION

The primary objective of this volume is to summarize the present state of knowledge (and, by implication, its important reciprocal, ignorance) of the taxonomy and distributions of native mammals in present-day Bolivia. The reader needs to look elsewhere for illustrations in color, illustrations of whole animals, or general summaries of biology of the species treated here. Information contained in those sources is not summarized, although a few are cited for the convenience of readers. The focus is on taxonomy and distribution, on new information, and on specimens or studies within Bolivia. Some notes on topics other than taxonomy and distribution are included when they are based on work within Bolivia. In most such cases, although the data are of limited scope, the paucity of such information warrants its inclusion. For example, under the category of "reproduction," a few scattered records of litter size, months of pregnancies, and presence of young may be given.

Fieldwork and collecting by Bolivians, in collaboration with foreign workers, have increased in recent years. Because taxonomic studies are continuing, we can look forward to continued progress in understanding the distribution and taxonomy of Bolivian mammals. But considering what needs to be learned, work has just begun. Account after account will mention or imply more unresolved questions than resolved ones. The keys, tables of measurements, synonymies, maps, lists of specimens, and other information here offered should provide a basis for further work.

In piecing together the details of geographic distributions of animals or plants, it is not sufficient to have only a list of localities from specimen labels or other sources. One needs to know the detailed itineraries of the individual collectors. Sometimes routes of travel are described in original fieldnotes. In other cases, when notes were not available, the itinerary needed to be reconstructed by comparing dates and locality designations for an entire collection. If the collector was available, he or she might be consulted directly, and I have done this in several cases. Published maps or descriptions of expeditions are helpful in other cases. In every case, geographic and taxonomic detective work is required. For example, there are dozens of places named San Ramón in Bolivia. In fact there may be as many as three different locations named San Ramón in one province within a single department. A section titled Mammalogical Gazetteer of Bolivia provides further detail on all known collecting localities. Unresolved problems are also noted. Subsequent sections—Collecting in Bolivia and Persons and Institutions—also help establish precise localities. Acronyms for collections housing Bolivian specimens are included.

All cited material is listed in the References except some papers in which names above the level of species were proposed. These may be found in other sources such as Wilson and Reeder (1993).

TAXONOMIC CONCEPTS

The use of the genus as an essential part of a hierarchical classification dates from the arbitrarily established beginning of scientific nomenclature in zoology (Linnaeus, 1758). A genus is a taxon at a slightly higher level in a classification than a species. In theory, if a genus is regarded as a group, then the idea of a genus containing only one species seems redundant. However, about one-half of living mammalian species are placed in genera with only one species. These are the monotypic, or at least monospecific, genera. Monotypic genera are reasonable in terms of the traditional use of a phenetic criterion by which the degree of morphological difference is considered. Other criteria may be considered, for example phylogeny or strict monophyly are more important in a cladistic approach to classification. For most mammalian genera, no careful cladistic analysis has been done and thus no well established hypothesis of detailed phylogenetic relationships exists. The future completion of such analyses and hypotheses is desirable. However, for practical taxonomy now, I am inclined to continue using the existing classification until additional and reasonably strong evidence, as opposed to a mere difference of opinion, is presented in favor of a change. This view is eclectic, not strictly phenetic or cladistic, and, in the interests of nomenclatural stability, my taxonomy is cautiously conservative. Another consideration is the convenience for readers when an author uses some readily available and familiar classification, and then documents only the departures therefrom. For this reason, the classification used here is generally that of Wilson and Reeder (1993). Their classification did not deal with subspecies. Some of the implications and ramifications of these different taxonomic approaches were discussed earlier (Anderson, 1974, 1985a) and need not be repeated here. Another recent review of taxonomic trends in mammalogy is that of Engstrom et al. (1994).

The concept of species in systematic biology has an interesting and varied history and no one definition can be applied to all groups. Furthermore, different biologists may have different concepts for the same group of organisms. For Recent mammals, I think that the so-called "biological species concept" of actually or potentially interbreeding populations of individuals has more advantages than any alternative concept. I hold this view in full awareness that the actual entities we deal with are individual specimens and that interbreeding is rarely observed, but is an inference from morphological data.

Most species have relatively small geographic ranges and may be expected to exhibit little geographic variation. However the majority of species that have larger geographic ranges may be expected to exhibit some significant degree of geographic variation. Subspecies, with trinomial names, have been used generally for formal recognition of selected contiguous geographic populations that have both some degree of morphological homogeneity and some degree of difference from other subspecies. The literature displays a wide range of taxonomic opinions about what degrees of distributional contiguity of local populations within a subspecies—or what degree of morphological (karyological, biochemical, etc.) homogeneity—should be recognized by formal subspecies. Likewise, opinions vary on the degree of difference that should be required before separate subspecies are recognized, or whether the concept should simply be abandoned. The concept has not been abandoned, and I do not propose to do so (again, I refer to an earlier discussion in Anderson and Nelson, 1965). A recently published set of papers (Kimbel and Martin, 1993) nicely summarizes the ongoing saga of species concepts in taxonomy.

Now, having stated my intention to use genera, species, and subspecies, let me emphasize several qualifications and limitations, in the context of current knowledge of the taxonomy of Bolivian mammals. Every taxon recognized here, from the subspecies on up, should be regarded as a taxonomic hypothesis subject to, or in most cases in critical need of, further testing. Every student who sits down and attempts to identify a specimen using this publication should understand that he or she is testing the current taxonomic and biogeographic hypotheses. The specimen may be of a species or subspecies not previously known from Bolivia. It may be of a species unknown to science. It may be from a local population with somewhat different characters than any examined before. It may demonstrate that the morphological limits of the species, as presently understood, need to be redefined. It may demonstrate that one or more of the characters used in the keys are wrong or need modification. The essential point is that taxonomy is not a static body of knowledge, but a dynamic process leading to better understanding, not to absolute truth.

LIST OF TAXA

All native species (321, including *Homo sapiens*) of mammals represented by specimens in collections are listed here and presented in the following accounts. Also included (and noted as such in this list) are ten domestic species, two that are native to the Americas and eight that have been introduced from the Old World. At least three other introduced species (of the genera *Mus*, *Rattus*, and *Lepus*) exist as feral populations. Imbedded among the accounts of known species, and in a separate summary following these accounts, are references to species of postulated occurrence, which are not included in this list.

The sequence of orders, families, subfamilies, and tribes is mostly that of Wilson and Reeder (1993). Orders are arranged phylogenetically, i.e., with more "primitive" groups placed before more "derived" or "specialized" groups. The published literature reflects uncertainty about this somewhat traditional sequence and has resulted in various placements of orders such as the Xenarthra, Cetacea, and others. In Wilson and Reeder (1993), families and subfamilies are arranged alphabetically in some orders and phylogenetically in others. These "phylogenetic" arrangements must be somewhat arbitrary because the phylogeny produced by evolution is a branching tree and not a linear sequence. The arrangement of taxa at the generic, subgeneric, specific, and subspecific levels is alphabetical. This arrangement is for the convenience of readers, most of whom know the alphabet better than they know the currently postulated phylogenetic relationships at this level.

The List of Taxa has page references and thus can serve both as a checklist and as a table of contents. Numbers of localities and numbers of specimens are given also, to provide an overview of commonness and rarity. For species with more than one subspecies, the totals are for the entire species rather than the separate subspecies.

	Pg.	Locality total	Total Spec.
Order Marsupialia			
Family Didelphidae			
Subfamily Caluromyinae			
Genus *Caluromys*			
C. lanatus lanatus	140	7	20
Genus *Glironia*			
G. venusta	140	2	2
Subfamily Didelphinae			
Genus *Chironectes*			
C. minimus minimus	141	2	8
Genus *Didelphis*			
D. albiventris albiventris	143	25	62
D. albiventris pernigra	144		
D. marsupialis marsupialis	145	77	249
Genus *Gracilinanus*			
G. aceramarcae	146	2	3
G. agilis buenavistae	147	25	68
G. agilis chacoensis	148		
G. agilis unduaviensis	148		
Genus *Lutreolina*			
L. crassicaudata crassicaudata	149	4	10
Genus *Marmosa*			
M. lepida	150	2	7
M. murina	150	7	13

	Pg.	Locality total	Total Spec.
Genus *Marmosops*			
M. dorothea	151	23	46
M. impavidus	152	5	6
M. noctivagus keaysi	154	17	45
M. parvidens	154	1	1
Genus *Metachirus*			
M. nudicaudatus bolivianus	155	22	45
Genus *Micoureus*			
M. constantiae budini	156	55	142
M. constantiae constantiae	156		
M. regina	157	11	13
Genus *Monodelphis*			
M. adusta	158	1	2
M. brevicaudata	158	6	12
M. domestica	159	25	85
M. emiliae	159	1	1
M. kunsi	160	3	3
M. osgoodi	160	3	4
Genus *Philander*			
P. opossum canus	162	71	186
Genus *Thylamys*			
T. macrurus	163	1	1
T. pallidior	163	19	48
T. pusillus	164	14	48
T. venustus	165	52	181
Family Caenolestidae			
Genus *Lestoros*			
L. inca	166	1	1
Order Xenarthra			
Family Bradypodidae			
Genus *Bradypus*			
B. variegatus	167	18	51
Family Choloepidae			
Genus *Choloepus*			
C. hoffmanni	168	2	2
Family Dasypodidae			
Subfamily Chlamyphorinae			
Genus *Chlamyphorus*			
C. retusus retusus	169	3	6
Subfamily Dasypodinae			
Tribe Dasypodini			
Genus *Dasypus*			
D. kappleri beniensis	170	3	3
D. novemcinctus novemcinctus	171	42	429
D. septemcinctus	172	5	9
Tribe Euphractini			
Genus *Chaetophractus*			
C. nationi	173	8	24
C. vellerosus	174	9	12
C. villosus	174	3	8

	Pg.	Locality total	Total Spec.
Genus *Euphractus*			
E. sexcinctus boliviae	175	23	44
Tribe Priodontini			
Genus *Cabassous*			
C. unicinctus squamicaudis	177	4	4
Genus *Priodontes*			
P. maximus	177	10	16
Tribe Tolypeutini			
Genus *Tolypeutes*			
T. matacus	178	14	29
Family Myrmecophagidae			
Genus *Cyclopes*			
C. didactylus catellus	179	8	36
Genus *Myrmecophaga*			
M. tridactyla tridactyla	180	15	22
Genus *Tamandua*			
T. tetradactyla	181	46	129
Order Chiroptera			
Family Emballonuridae			
Genus *Peropteryx*			
P. kappleri	184	2	5
P. macrotis macrotis	185	7	16
Genus *Rhynchonycteris*			
R. naso	185	17	55
Genus *Saccopteryx*			
S. bilineata	186	15	75
S. leptura	187	3	12
Family Noctilionidae			
Genus *Noctilio*			
N. albiventris affinis	189	41	522
N. leporinus rufescens	190	26	50
Family Mormoopidae			
Genus *Pteronotus*			
P. (*Chilonycteris*) *personatus personatus*	191	1	1
P. (*Phyllodia*) *parnellii rubiginosus*	192	3	3
P. (*Pteronotus*) *gymnonotus*	192	1	1
Family Phyllostomidae			
Subfamily Phyllostominae			
Genus *Chrotopterus*			
C. auritus	193	7	7
Genus *Lonchorhina*			
L. aurita	194	1	1
Genus *Macrophyllum*			
M. macrophyllum	194	7	9
Genus *Micronycteris*			
M. (*Barticonycteris*) *daviesi*	195	1	1
M. (*Micronycteris*) *megalotis megalotis*	196	2	3
M. (*M.*) *minuta*	197	7	9
M. (*Trinycteris*) *nicefori*	197	1	2

	Pg.	Locality total	Total Spec.
Genus *Mimon*			
M. crenulatum longifolium	198	5	6
Genus *Phyllostomus*			
P. discolor discolor	199	10	31
P. elongatus	200	15	24
P. hastatus hastatus	201	46	132
P. stenops boliviensis	202	6	8
Genus *Tonatia*			
T. brasiliense	203	3	3
T. carrikeri	203	1	1
T. saurophila maresi	204	5	5
T. sylvicola sylvicola	205	16	30
Genus *Trachops*			
T. cirrhosus cirrhosus	207	15	21
Genus *Vampyrum*			
V. spectrum	207	1	1
Subfamily Lonchophyllinae			
Genus *Lonchophylla*			
L. thomasi	208	9	12
Subfamily Glossophaginae			
Genus *Anoura*			
A. caudifer	209	20	42
A. cultrata	210	1	2
A. geoffroyi geoffroyi	211	25	83
A. geoffroyi peruana	211		
Genus *Choeroniscus*			
C. intermedius	212	1	1
C. minor	212	3	3
Genus *Glossophaga*			
G. soricina soricina	213	124	728
Genus *Lichonycteris*			
L. obscura	215	1	1
Subfamily Carolliinae			
Genus *Carollia*			
C. brevicauda	216	100	413
C. castanea	218	22	123
C. perspicillata	219	180	1597
Genus *Rhinophylla*			
R. pumilio	222	10	45
Subfamily Stenodermatinae			
Genus *Artibeus*			
A. anderseni	223	68	183
A. glaucus glaucus	225	33	100
A. glaucus gnomus	226		
A. hartii	226	6	6
A. jamaicensis fallax	228	123	720
A. lituratus lituratus	230	135	932
A. obscurus	232	133	381
Genus *Chiroderma*			
C. salvini salvini	235	10	16

	Pg.	Locality total	Total Spec.
C. trinitatum trinitatum	236	20	61
C. villosum villosum	237	32	105
Genus *Mesophylla*			
M. macconnelli macconnelli	238	17	34
Genus *Platyrrhinus*			
P. brachycephalus	239	5	7
P. dorsalis	239	12	78
P. helleri incarum	241	87	426
P. infuscus	242	17	39
P. lineatus lineatus	243	34	175
P. lineatus nigellus	244		
P. vittatus	244	2	9
Genus *Pygoderma*			
P. bilabiatum magna	245	18	53
Genus *Sphaeronycteris*			
S. toxophyllum	246	9	11
Genus *Sturnira*			
S. erythromos	246	44	237
S. lilium lilium	248	146	669
S. magna	250	7	20
S. oporaphilum	251	38	310
S. tildae	252	16	42
Genus *Uroderma*			
U. bilobatum bilobatum	254	97	374
U. bilobatum thomasi	254		
U. magnirostrum	255	69	192
Genus *Vampyressa*			
V. bidens	257	5	11
V. pusilla thyone	258	4	8
Genus *Vampyrodes*			
V. caraccioli major	259	4	21
Subfamily Desmodontinae			
Genus *Desmodus*			
D. rotundus	259	95	392
D. youngii	261	13	20
Genus *Diphylla*			
D. ecaudata	262	2	2
Family Thyropteridae			
Genus *Thyroptera*			
T. discifera discifera	264	1	14
T. tricolor tricolor	264	6	18
Family Vespertilionidae			
Genus *Eptesicus*			
E. andinus	265	2	3
E. furinalis chapmani	266	36	128
E. furinalis furinalis	267		
E. furinalis montosus	267		
Genus *Histiotus*			
H. montanus laephotis	268	5	7
H. velatus	268	4	4

	Pg.	Locality total	Total Spec.
Genus *Lasiurus*			
L. blossevillii frantzii	269	12	15
L. cinereus villosissimus	270	10	11
L. ega ega	271	19	38
Genus *Myotis*			
M. (*Leuconoe*) *albescens*	272	36	282
M. (*L.*) *levis dinellii*	274	5	8
M. (*L.*) *oxyotus oxyotus*	275	6	12
M. (*L.*) *riparius*	275	3	4
M. (*L.*) *simus*	276	4	48
M. (*Selysius*) *keaysi keaysi*	277	10	12
M. (*S.*) *nigricans nigricans*	278	99	1544
Genus *Rhogeessa*			
R. tumida	280	1	1
Family Molossidae			
Genus *Eumops*			
E. auripendulus auripendulus	282	11	49
E. bonariensis beckeri	282	16	396
E. glaucinus glaucinus	283	8	25
E. hansae	284	2	2
E. perotis perotis	285	6	52
E. perotis trumbulli	285		
Genus *Molossops*			
M. abrasus	285	1	1
M. planirostris planirostris	287	8	25
M. temminckii temminckii	287	17	59
Genus *Molossus*			
M. molossus crassicaudatus	289	90	1839
M. rufus	290	17	67
Genus *Nyctinomops*			
N. aurispinosus	291	3	10
N. laticaudatus europs	292	13	130
N. laticaudatus laticaudatus	292		
N. macrotis	293	3	3
Genus *Promops*			
P. centralis occultus	293	3	5
P. nasutus ancilla	294	3	4
Genus *Tadarida*			
T. brasiliensis brasiliensis	295	11	67
Order Primates			
Family Callitrichidae			
Subfamily Callimiconinae			
Genus *Callimico*			
C. goeldii	296	2	3
Subfamily Callitrichinae			
Genus *Callithrix*			
C. melanura	298	13	31
Genus *Cebuella*			

	Pg.	Locality total	Total Spec.
C. pygmaea	299	1	1
Genus *Saguinus*			
S. fuscicollis weddellii	301	9	22
S. imperator imperator	302	1	1
S. labiatus labiatus	302	8	16
Family Cebidae			
Subfamily Alouattinae			
Genus *Alouatta*			
A. caraya	304	17	75
A. guariba beniensis	305	2	6
A. seniculus sara	307	35	128
Subfamily Aotinae			
Genus *Aotus*			
A. azarai azarai	309	49	145
A. azarai boliviensis	309		
A. nigriceps	310	3	4
Subfamily Atelinae			
Genus *Ateles*			
A. chamek	311	33	93
Subfamily Callicebinae			
Genus *Callicebus*			
C. brunneus	313	6	9
C. donacophilus donacophilus	314	18	86
C. donacophilus pallescens	315		
C. modestus	315	1	2
C. olallae	316	1	1
Subfamily Cebinae			
Genus *Cebus*			
C. albifrons cuscinus	317	24	59
C. albifrons unicolor	317		
C. apella pallidus	319	57	174
C. apella paraguayanus	320		
Genus *Saimiri*			
S. sciureus boliviensis	322	54	232
Subfamily Pitheciinae			
Genus *Pithecia*			
P. irrorata irrorata	324	3	3
Family Hominidae			
Genus *Homo*			
H. sapiens	325		
Order Carnivora			
Family Canidae			
Genus *Atelocynus*			
A. microtis	325	4	4
Genus *Canis* (domestic, introduced)			
C. familiaris	326	12	15
Genus *Cerdocyon*			
C. thous entrerianus	327	40	116
Genus *Chrysocyon*			
C. brachyurus	328	5	4

	Pg.	Locality total	Total Spec.
Genus *Pseudalopex*			
P. culpaeus andina	330	16	23
P. gymnocercus gymnocercus	331	12	43
Genus *Speothos*			
S. venaticus venaticus	332	3	8
Family Felidae			
Genus *Felis*			
F. (*Felis*) *catus* (domestic, introduced)	332	2	2
F. (*Herpailurus*) *yaguarondi eyra*	333	6	24
F. (*Leopardus*) *pardalis steinbachi*	334	26	68
F. (*L.*) *wiedii boliviae*	335	12	24
F. (*Lynchailurus*) *pajeros garleppi*	336	4	6
F. (*Oncifelis*) *geoffroyi euxantha*	337	10	22
F. (*Oreailurus*) *jacobita*	337	9	14
F. (*Puma*) *concolor acrocodia*	339	23	38
F. (*P.*) *concolor osgoodi*	339		
Genus *Panthera*			
P. onca palustris	341	22	28
P. onca peruviana	341		
Family Mustelidae			
Subfamily Lutrinae			
Genus *Lutra*			
L. longicaudis enudris	343	17	30
Genus *Pteronura*			
P. brasiliensis paranensis	344	2	6
Subfamily Mephitinae			
Genus *Conepatus*			
C. chinga rex	345	18	24
Subfamily Mustelinae			
Genus *Eira*			
E. barbara barbara	346	26	71
E. barbara peruana	346		
Genus *Galictis*			
G. cuja luteola	347	10	10
G. vittata andina	348	6	9
Genus *Mustela*			
M. frenata boliviensis	349	5	6
Family Procyonidae			
Subfamily Potosinae			
Genus *Bassaricyon*			
B. alleni	349	4	4
Genus *Potos*			
P. flavus chapadensis	351	15	39
Subfamily Procyoninae			
Genus *Nasua*			
N. nasua boliviensis	352	58	278
N. nasua dorsalis	352		
N. nasua spadicea	353		
Genus *Procyon*			
P. cancrivorus cancrivorus	354	13	30

	Pg.	Locality total	Total Spec.
Family Ursidae			
Genus *Tremarctos*			
T. ornatus	354	9	19
Order Odontoceti			
Family Platanistidae			
Genus *Inia*			
I. geoffrensis boliviensis	359	12	18
Order Perissodactyla			
Family Equidae (domestic, introduced)			
Genus *Equus*			
E. asinus	360	1	2
E. caballus	360	1	1
Family Tapiridae			
Genus *Tapirus*			
T. terrestris spegazzinii	360	24	35
Order Artiodactyla			
Family Suidae (domestic, introduced)			
Genus *Sus*			
S. scrofa	361	2	3
Family Tayassuidae			
Genus *Catagonus*			
C. wagneri	362	4	5
Genus *Tayassu*			
T. pecari albirostris	363	36	213
T. tajacu tajacu	364	57	316
Family Camelidae			
Genus *Lama*			
L. (*Lama*) *glama* (domestic, native)	366	2	3
L. (*L.*) *guanicoe guanicoe*	366	9	11
L. (*Vicugna*) *pacos* (domestic, native)	367	7	17
L. (*V.*) *vicugna*	368	25	50
Family Cervidae			
Subfamily Odocoileinae			
Genus *Hippocamelus*			
H. antisensis	369	6	12
Genus *Mazama*			
M. americana	370	24	53
M. bricenii chunyi	372	2	2
M. gouazoupira gouazoupira	373	34	83
Genus *Odocoileus*			
O. (*Blastocerus*) *dichotomus*	374	16	62
O. (*Odocoileus*) *virginianus peruvianus*	375	1	0
O. (*Ozotoceros*) *bezoarticus leucogaster*	376	2	5
Family Bovidae (domestic, introduced)			
Subfamily Bovinae			
Genus *Bos*			
B. taurus	376	1	1
Subfamily Caprinae			
Genus *Capra*			
C. hircus	377	1	1

	Pg.	Locality total	Total Spec.
Genus *Ovis*			
O. aries	377	1	1
Order Rodentia			
Suborder Sciurognathi			
Family Sciuridae			
Genus *Sciurus*			
S. ignitus argentinius	378	59	149
S. ignitus boliviensis	379		
S. ignitus ignitus	379		
S. spadiceus	380	48	183
Family Muridae			
Subfamily Murinae (introduced, commensal)			
Genus *Mus*			
M. musculus	382	66	731
Genus *Rattus*			
R. rattus	383	57	328
Subfamily Sigmodontinae			
Tribe Oryzomyini			
Genus *Microryzomys*			
M. minutus	385	10	28
Genus *Neacomys*			
N. spinosus spinosus	386	43	124
Genus *Nectomys*			
N. squamipes garleppii	388	13	24
Genus *Oecomys*			
O. bicolor bicolor	389	32	193
O. concolor	389	3	3
O. mamorae	390	44	132
O. roberti	391	2	3
Genus *Oligoryzomys*			
O. andinus	392	6	14
O. chacoensis	392	20	144
O. destructor	393	53	181
O. flavescens group, sp. B	395	33	239
O. microtis	396	126	618
Genus *Oryzomys*			
O. capito	399	78	313
O. legatus	400	13	45
O. levipes	401	36	248
O. nitidus	402	103	508
O. subflavus	404	56	320
O. yunganus	405	8	11
Genus *Rhipidomys*			
R. couesi austrinus	407	20	72
R. leucodactylus rex	408	4	4
R. nitela	408	3	3
Genus *Thomasomys*			
T. aureus aureus	409	11	20
T. daphne australis	410	12	44

	Pg.	Locality total	Total Spec.
T. ladewi	410	4	12
T. oreas	411	1	2
T. taczanowskii	411	1	2
Tribe Akodontini			
Genus *Akodon*			
A. aerosus baliolus	413	37	206
A. albiventer berlepschii	415	45	191
A. boliviensis	416	54	342
A. dayi	418	41	257
A. fumeus	419	50	253
A. lutescens caenosus	421	53	371
A. lutescens lutescens	422		
A. lutescens puer	422		
A. mimus	423	28	533
A. pervalens	424	6	10
A. siberiae	425	6	35
A. simulator tartareus	426	10	122
A. subfuscus subfuscus	427	16	75
A. toba	427	10	91
A. varius	428	42	345
Genus *Bolomys*			
B. amoenus	430	4	13
B. lactens lactens	431	6	15
B. lenguarum tapirapoanus	431	116	913
Genus *Chroeomys*			
C. andinus dolichonyx	434	9	25
C. jelskii bacchante	435	17	113
C. jelskii ochrotis	435		
C. jelskii pulcherrimus	436		
C. jelskii sodalis	436		
Genus *Lenoxus*			
L. apicalis boliviae	436	5	35
Genus *Oxymycterus*			
O. hucucha	437	4	5
O. inca doris	437	27	91
O. inca iris	438		
O. paramensis jacentior	439	55	352
O. paramensis nigrifrons	439		
O. paramensis paramensis	440		
Tribe Scapteromyini			
Genus *Kunsia*			
K. tomentosus tomentosus	440	3	4
Tribe uncertain			
Genus *Pseudoryzomys*			
P. simplex	441	5	6
Tribe Phyllotini			
Genus *Andinomys*			
A. edax edax	442	23	69
Genus *Auliscomys*			
A. (*Maresomys*) *boliviensis boliviensis*	444	9	48

	Pg.	Locality total	Total Spec.
A. (*Auliscomys*) *pictus*	444	11	30
A. (*A.*) *sublimis leucurus*	445	24	175
A. (*A.*) *sublimus sublimis*	445		
Genus *Calomys*			
C. callosus callosus	447	135	2829
C. laucha	449	4	21
C. lepidus carillus	450	44	248
C. lepidus ducillus	451		
C. musculinus	451	26	99
C. tener	452	3	3
C. venustus	453	30	85
Genus *Chinchillula*			
C. sahamae	454	6	15
Genus *Eligmodontia*			
E. puerulus	455	24	77
Genus *Galenomys*			
G. garleppii	456	4	12
Genus *Graomys*			
G. domorum domorum	458	41	255
G. domorum taterona	459		
G. griseoflavus griseoflavus	460	15	210
G. pearsoni dorbignyi	461	1	2
Genus *Neotomys*			
N. ebriosus ebriosus	462	9	26
N. ebriosus vulturnus	462		
Genus *Phyllotis*			
P. caprinus	462	7	58
P. chilensis	463	9	66
P. osilae osilae	465	39	198
P. osilae phaeus	465		
P. wolffsohni	465	36	201
P. xanthopygus rupestris	467	73	493
Genus undescribed	469	1	2
Tribe uncertain			
Genus *Holochilus*			
H. sciureus amazonicus	470	49	263
Tribe Ichthyomyini			
Genus *Chibchanomys*			
C. unidentified	471	1	1
Suborder Hystricognathi			
Family Erethizontidae			
Genus *Coendou*			
C. bicolor simonsi	472	13	16
C. prehensilis boliviensis	473	14	50
Family Chinchillidae			
Genus *Chinchilla* (probably extinct in Bolivia)			
C. chinchilla	473	3	12
Genus *Lagidium*			
L. viscacia cuscus	476	47	138
L. viscacia cuvieri	476		
L. viscacia perlutea	477		

	Pg.	Locality total	Total Spec.
Genus *Lagostomus*			
L. maximus inmollis	478	7	16
Family Dinomyidae			
Genus *Dinomys*			
D. branickii	478	2	3
Family Caviidae			
Subfamily Caviinae			
Genus *Cavia* (domestic and wild)			
C. tschudii nana	480	45	149
Genus *Galea*			
G. musteloides auceps	481	68	266
G. musteloides demissa	481		
G. musteloides musteloides	482		
G. spixii campicola	483	4	13
Genus *Microcavia*			
M. niata niata	484	12	46
M. niata pallidior	484		
Subfamily Dolichotinae			
Genus *Dolichotis*			
D. salinicola salinicola	485	8	12
Family Hydrochaeridae			
Genus *Hydrochaeris*			
H. hydrochaeris hydrochaeris	486	28	65
Family Dasyproctidae			
Genus *Dasyprocta*			
D. punctata boliviae	488	55	248
D. punctata urucuma	489		
D. punctata yungarum	489		
Family Agoutidae			
Genus *Agouti*			
A. paca paca	490	43	146
Family Octodontidae			
Subfamily Ctenomyinae			
Genus *Ctenomys*			
C. boliviensis boliviensis	492	27	486
C. conoveri	493	10	15
C. frater frater	494	8	36
C. frater mordosus	494		
C. goodfellowi	495	2	4
C. leucodon	495	8	29
C. lewisi	496	2	57
C. minutus	496	1	3
C. opimus opimus	497	30	167
C. steinbachi	498	14	86
undescribed taxa	499		
Subfamily Octodontinae			
Genus *Octodontomys*			
O. gliroides	499	10	44

	Pg.	Locality total	Total Spec.
Family Abrocomidae			
Genus *Abrocoma*			
A. boliviensis	500	2	2
A. cinerea cinerea	501	7	41
Family Echimyidae			
Subfamily Dactylomyinae			
Genus *Dactylomys*			
D. boliviensis	501	6	13
Subfamily Echimyinae			
Genus *Echimys*			
E. didelphoides	502	2	2
Genus *Isothrix*			
I. bistriata bistriata	503	3	3
Subfamily Eumysopinae			
Genus *Mesomys*			
M. hispidus	504	3	4
Genus *Proechimys*			
P. brevicauda	505	73	485
P. hilda	507	8	10
P. longicaudatus	508	30	153
P. simonsi	509	8	13
P. steerei	510	15	71
Genus *Thrichomys*			
T. apereoides fosteri	512	1	1
Family Myocastoridae			
Genus *Myocastor*			
M. coypus popelairi	513	4	5
Order Lagomorpha			
Family Leporidae			
Genus *Lepus* (introduced, feral)			
L. europaeus	513	1	1
Genus *Oryctolagus* (domestic, introduced)			
O. cuniculus	514	0	0
Genus *Sylvilagus*			
S. brasiliensis gibsoni	515	35	86
S. brasiliensis inca	515		
S. brasiliensis paraguensis	516		

KEYS TO THE MAMMALS OF BOLIVIA

After a preliminary identification of a specimen is obtained by using the keys, further testing should be done by checking the distributional map, the tables of measurements, and the individual account. In difficult cases, comparison with specimens in collections and with newer literature will be needed.

The following 28 illustrated keys are intended to aid in the identification of native and introduced species of mammals known or hypothesized to occur in Bolivia now or formerly (i.e., within historic times). Hypothesized species not actually represented by a specimen in a museum collection are indicated by an asterisk (*). A number of species that I might include if I were rewriting the key now (1995) are not here. The first key is to orders and families and it refers the user to the appropriate family key if more than one species of the family is involved.

The illustrations are intended to help the user who is not already familiar with the technical terminology or with the distinction emphasized in the key. Both external and internal (cranial and dental) features are used, so it is necessary in some cases to have a specimen consisting of both skin and cleaned skull. Calipers and lenses for magnification are also needed in some cases. If there is doubt about a given choice, proceed to both of the alternatives and see if subsequent choices seem relevant. If they do not seem relevant, then the alternative original choice is indicated.

Ideas and illustrations for the keys have been derived from many sources. It is not feasible to acknowledge every specific source, but major sources were the following:

Tate (1933, *Marmosa* revision)
Goodwin and Greenhall (1961, bats of Trinidad, drawings used here as figs. 65, 69–70, 103–104, 110, 114, 132, 135–138, and 185–186)
Anderson (1972, Chihuahuan keys, drawings used here as figs. 172, 225, 261—262, 290–291)
Rouk and Carter (1972, drawings from the description of *V. brachycephalus* used here as fig. 157)
Pine (1973a, Brazilian key)
Eger (1977, *Eumops* revision, source of figs. 190–192)
Husson (1978, Suriname, drawings used here as figs. 3, 34, and 35)
Langguth and Anderson (1980, Uruguayan key, drawings by Fran Stiles appear here as figs. 249–250, 253–254, 259, 272–274)
Hall (1981, drawings by Victor Hogg used here as figs. 43–46, 116–119, 133—134, 189, and 193–194)
Albuja (1982, Ecuadorian bat key)
Anderson and Jones (1984, drawings by Marie Dauenheimer, used here as figs. 9 and 218)
Linares (1986, Venezuelan bat key)
Olds (1988, the genus *Calomys*)

List of Numbered Keys

1. General key to orders and families
2. Didelphidae
3. Emballonuridae
4. Noctilionidae
5. Mormoopidae
6. Phyllostomidae
7. Thyropteridae
8. Vespertilionidae
9. Molossidae
10. Callitrichidae and Cebidae
11. Myrmecophagidae
12. Dasypodidae
13. Canidae
14. Procyonidae
15. Mustelidae
16. Felidae
17. Tayassuidae
18. Camelidae
19. Cervidae
20. Bovidae
21. Leporidae
22. Sciuridae
23. Muridae
24. Echimyidae
25. Octodontidae and Abrocomidae
26. Chinchillidae
27. Caviidae
28. Erethizontidae

KEY 1

ORDERS AND FAMILIES OF LIVING MAMMALS OF BOLIVIA

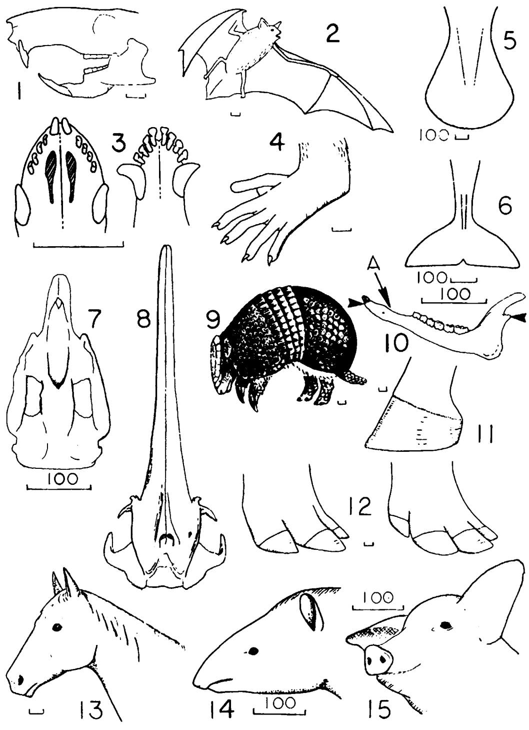
1 Incisor teeth reduced to a single large and persistently growing pair in both upper and lower jaws (fig. 1); no small secondary pair behind the upper pair; wide gap between incisors and grinding teeth .... **Order Rodentia,** 23

Incisor teeth range in number from none to five upper and none to four lower pairs, but are never a single pair as described above 2

2(1) Front limbs modified as wings; bones of hand and fingers greatly elongated; wing membranes connect fingers with each other and with body (fig. 2); bones of skull relatively thin and fused so that few sutures are visible; skull shorter that 54 mm .. **Order Chiroptera,** 34

Front limbs not wings; forelimbs not as described; bones of skull relatively heavy and many sutures visible; skull in many species longer than 54 3

3(2) Ten upper incisors and eight lower incisors (fig. 3); first hind toe projecting laterally (in one species connected by web) and without claw or nail (figs. 4, 97, and 98) .... **Order Marsupialia, Family Didelphidae**, Key 2



Fewer incisors above and below; first hind toe present or not; if present, somewhat opposable or not (usually not), and with claw or nail 4

4(3) Front limbs are paddle like; no hind limbs; distally, tail horizontally flattened; exclusively aquatic 5

Not as above 6

5(4) Tail with rounded margin (fig. 5); anterior grinding teeth, usually noticeably more worn than posterior ones; teeth with cusps or lophs and not simple and conical; skull heavy, bones dense, zygomatic arch massive (fig. 7); possibly reach extreme northern Bolivia in the Abuna River .... ***Order Sirenia, Family Trichechidae,** ***Trichechus inunguis***

Tail with two lateral flukes (fig. 6); teeth numerous, mostly simple and terminally more or less conical; skull with thin bones, zygomatic arch incomplete (fig. 8), snout long and slender .... **Order Odontoceti, Family Platanistidae,** ***Inia geoffrensis***

6(4) Teeth absent or simple, subcylindrical, and without enamel, no incisors present .... **Order Xenarthra,** 7

Teeth present and not subcylindrical, enamel present, incisors present or absent 10

[Order Xenarthra begins here]

7(6) No teeth whatsoever; mouth relatively small, tongue very long and vermiform; eats ants and termites .... **Family Myrmecophagidae,** Key 11

Teeth present; mouth of moderate size, tongue not extremely long and vermiform; food not exclusively ants and termites 8

8(7) Dorsal surface well haired and without armor of plates; limbs relatively long; claws long, laterally compressed and curved for hanging from branches; movements slow and deliberate; climbs trees; eats leaves 9

Dorsal surface in most species without much hair and with a bony carapace or armor of plates; limbs relatively short and stout; claws heavily built for digging (fig. 9); movement sometimes rapid; ground dweller, burrower, eats insects .... **Family Dasypodidae,** Key 12

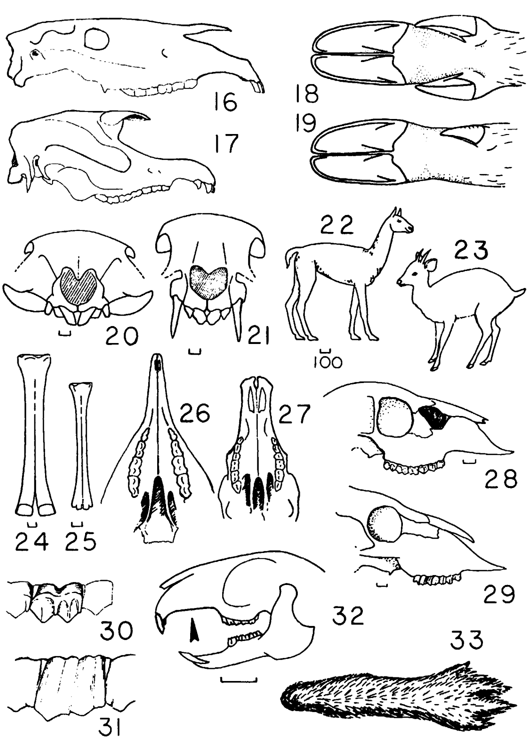
9(8) Anterior upper tooth smaller than next tooth and space between them less than length of crown of second tooth; alveolar length of upper tooth row less than 30 mm; three claws on forefoot; tail not rudimentary (but it is short, less than one-tenth of length of head and body); hair relatively short and crisp; face whitish with brown circumorbital areas .... **Family Bradypodidae,** ***Bradypus variegatus***

Anterior upper tooth larger than next tooth and space between them greater than length of second tooth; alveolar length of upper tooth row more than 30; two claws on forefoot; tail rudimentary; hair long; face brownish .... **Family Choloepidae, *Choloepus hoffmanni***

10(6) One or more toes of each foot have a conspicuous hoof or (in camelids) foot with two large padlike toes, each with a nail-like hoof at the front; large gap (fig. 10A) between grinding teeth and incisors at front of lower jaw and length of jaw from articular process (fig. 10) more than 85 mm 11

No toe has a conspicuous hoof (but toes usually have claws or nails), never with only two conspicuous toes; no large diastema in lower tooth row, or, if so, then jaw shorter than 85 17

11(10) Main axis of foot lies in middle of central



toe that is larger than other toes; upper incisor teeth present; skull as shown in figs. 16 or 17 .... **Order Perissodactyla,** 12

Main axis of foot lies between two toes of about equal size; some species have no upper incisors; skull as shown in figs. 20, 21, or 26–29 .... **Order Artiodactyla,** 13

[Order Perissodactyla begins here]

12(11) A single large rounded hoof on each foot (fig. 11); nose not a flexible proboscis although lip is somewhat flexible (fig. 13); nasal bones relatively long anteriorly and nasal opening on skull not unusually displaced posteriorly (fig. 16); domesticated ...... **Family Equidae**

More than one conspicuous hoof on each foot (four front, three rear, fig. 12); nose elongated (fig. 14); nasal opening of skull displaced posteriorly (fig. 17) ... **Family Tapiridae, *Tapirus terrestris***

[Order Artiodactyla begins here]

13(11) Snout piglike, flattened, with rim, and somewhat rounded (fig. 15); canine teeth large, upper incisors present and not reduced to a single lateral pair in adults 14

Snout not as above; canine teeth absent or relatively small, upper incisors absent or reduced in adults to a single lateral pair 15

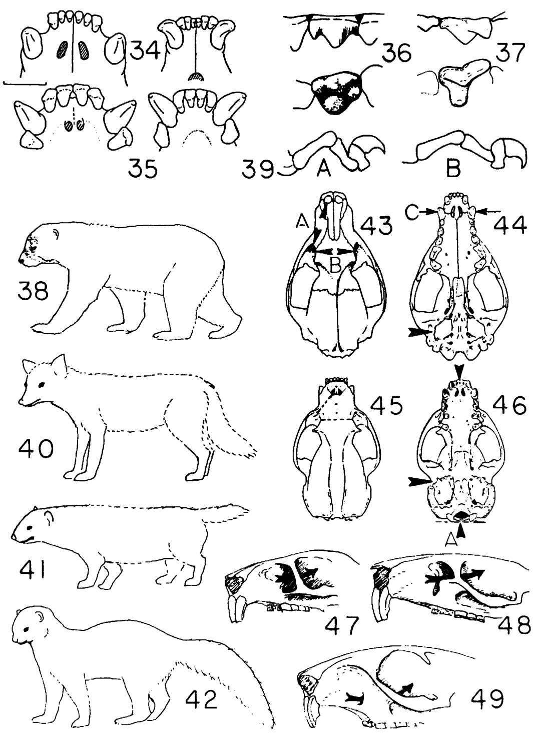
14(13) Four toes on hind feet (fig. 18); upper canines curving outward, three pairs of upper incisors (fig. 20), lower third molar longer than 35 mm, first lower premolar sometimes present; tail small but obvious and somewhat curled; domesticated ... **Family Suidae, *Sus scrofa***

Two or three (fig. 19) toes on hind feet; upper canines directed downward (fig. 21), two pairs of upper incisors, m3 considerably shorter than 35, p1 never present; tail scarcely evident externally .... **Family Tayassuidae,** Key 17

15(13) No horns or antlers at any time; hind part of body contracted, knee-joint low, thigh appears distinct from body (fig. 22); metapodials of cannon bone in each leg somewhat separated distally (fig. 24), their articular surfaces with limited keel, but not strongly grooved or pulley-shaped; cutaneous pad on each of two toes; nails on upper surfaces (rather than hoof encasing the last bone of each toe); two pairs of caniniform teeth in upper jaw (one a pair of incisors, the other a pair of canines), usually a pair of canines below, canines larger and more hooked in males, three pairs of lower incisiform teeth; deep medial posterior notch of palate extends considerably farther forward than lateral notches do (fig. 26) .... **Family Camelidae,** Key 18

Horns or antlers may be present in one or both sexes, continuously or at certain times of the year; thigh not so distinctly separate from body (fig. 23); cannon bone with little distal separation of two metapodials (fig. 25); articular surfaces strongly grooved or pulley-shaped; caniniform teeth absent, four pairs of lower incisiform teeth (lateral pair actually canines), anterior end of medial posterior notch of palate even with or posterior to lateral notches (fig. 27) .. 16

16(15) Vacuity conspicuous between lacrimal and nasal bones (fig. 28); molariform teeth brachydont (relatively low-crowned, fig. 30, young animal, unworn tooth); antlers of bony material and



with no permanent covering, present in males at least part of year, sometimes branched . . **Family Cervidae,** Key 19

Vacuity inconspicuous or not present (fig. 29); molariform teeth more hypsodont (high-crowned, fig. 31, young animal, unworn tooth); horns (with bony core and covering of horn), if present, not shed at times, never branched, in some species present in both sexes; domestic animals . . . **Family Bovidae,** Key 20

17(10) Canine teeth absent, major gap (diastema) between incisors and grinding teeth at back of jaws (fig. 32); soles of feet covered with hair (fig. 33) . . . . **Order Lagomorpha, Family Leporidae,** 21

Canine teeth present and often noticeably larger than adjacent incisors and premolars, no large diastemal gap; soles of feet not covered with hair 18

18(17) Total number of upper and lower incisors: 12 (3 pairs above, 3 pairs below) and outer upper incisors (I3) larger than other pairs (I1 or I2, fig. 34); neither pair of limbs especially elongated (except in *Chrysocyon*) . . **Order Carnivora,** 19

Total number of upper and lower incisors: 8 (2 pairs above, 2 pairs below) and I2 smaller than I1 (fig. 35); one pair or both pairs of limbs noticeably elongated . . . . **Order Primates,** 40

[Order Carnivora begins here]

19(18) Molariform teeth relatively low and rounded (fig. 36), none of them with sharp bladelike edge 20

Some molariform teeth bladelike, specifically in adults, the last upper premolar (P4, fig. 37) and first lower molar (m1); in young the carnassial teeth are P3 and p4 21

20(19) Tail very short, scarcely noticeable; large (head and body about 1.2 to 1.4 m; fig. 38) . . . . **Family Ursidae, *Tremarctos ornatus***

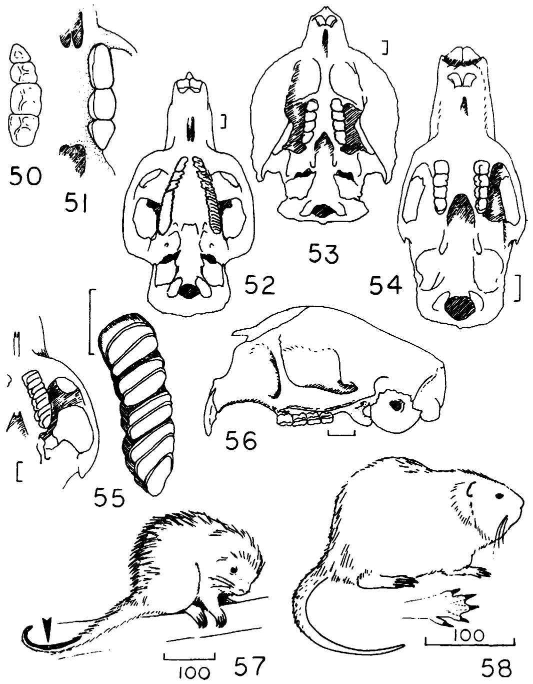
Tail from about 45% of head and body length to 1.3 times that length; small (head and body length about 400 mm) to medium (780 mm) . . . . **Family Procyonidae,** Key 14

21(19) Color a pattern of dark spots on paler background (in five species) or relatively uniformly brownish or reddish dorsally (in two species); claws sharp and retractable (most noticeably on front feet, fig. 39, A retracted, B extended) . . . . **Family Felidae,** Key 16

Color never a pattern of dark spots on paler background; claws duller and not retractable 22

22(21) Relatively long legs, height at shoulders usually more than 40% of length of head and body (fig. 40), or if not, then tail less than 40% of length of head and body (fig. 41); ears often relatively large and erect; facial part of head relatively longer, eye usually about midway between end of nose and ear opening; on skull, distance between orbit and anterior nares (fig. 43A) more than interorbital breadth (fig. 43B); braincase not extending noticeably behind ears (fig. 44) . . **Family Canidae,** Key 13

Relatively shorter legs (percentage noted above usually less than 40, or if not, then tail is more than 40% of length of head and body, fig. 42); ears relatively shorter and more rounded; facial part of head relatively shorter, eye usually nearer to end of nose than to ear opening; on skull, distance between orbit and anterior nares less than interorbital breadth (fig. 45); braincase extending noticeably behind ears (fig. 46) . . . . **Family Mustelidae,** Key 15



[Order Rodentia begins here]

23(1) Infraorbital canal not conspicuously enlarged (figs. 48, 49); tail present, long or short but clearly visible; ears tend to be rounded; head and body length never more than 320 mm 24

Infraorbital canal conspicuously enlarged (fig. 47); tail absent or present in various lengths; ears tend to have a slight posterior concavity of the margin; head and body in some species longer than 320 25

24(23) Tail always long and well haired, not scaly; arboreal and diurnal; infraorbital canal small (fig. 49); more than three teeth in upper molariform row (fig. 50) .... **Family Sciuridae,** Key 22

Tail of various lengths but never covered with long hair (usually with some short hair), scales clearly visible; most species not especially arboreal, most nocturnal; infraorbital canal not so small (fig. 48); only three teeth in upper molariform row (fig. 51) .... **Family Muridae,** Key 23

25(23) Tail not visible or scarcely visible, less than 10% of length of head and body; three toes on hind feet large, first and fifth digits much reduced 26

Tail clearly visible (more than 10% of length of head and body; more than three large toes on hind foot, first and fifth digits not disproportionally small 29

26(25) Head and body longer than 510 mm; hind foot longer than 100; skull longer than 100; greatest distance across upper molariform teeth more than 16 27

Head and body shorter than 510; hind foot shorter than 100; skull shorter than 100; greatest distance across first upper molariform teeth less than 16 mm .... **Family Caviidae,** Key 27

27(26) Head and body longer than 900 mm, skull longer than 200; last upper tooth larger than other three molariform teeth together (fig. 52) .... **Family Hydrochaeridae,** ***Hydrochaeris hydrochaeris***

Head and body shorter than 900; skull shorter than 200; last upper tooth smaller than other three molariform teeth together (figs. 53, 54) 28

28(27) Jugal and part of maxillary expanded, forming a thick plate with rough surface; skull relatively broad (fig. 53); pelage brown and with rows of whitish or yellowish spots or lines; five toes on hind foot .... **Family Agoutidae,** ***Agouti paca***

Zygomatic arch normally developed, no large plate, skull relatively slender (fig. 54); pelage blackish, without rows of spots and lines; three toes on hind foot .... **Family Dasyproctidae,** ***Dasyprocta* and *Myoprocta***

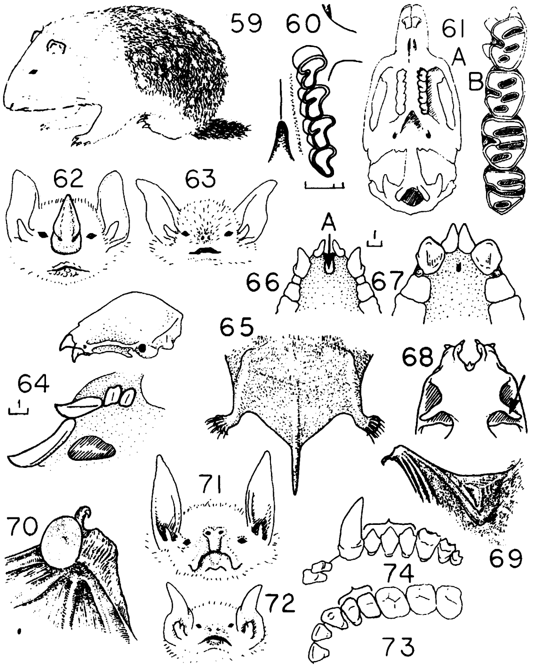
29(25) Tail relatively well haired throughout its length and with dorsal crest of coarser, longer hairs (many more than 30 mm) toward end of tail; feet and ventral side of tail never white; upper cheek teeth persistently growing and with tightly pressed transverse laminae (fig. 55) .. .. **Family Chinchillidae,** Key 26

Tail in most species scaled and with few hairs (or, in *Octodontomys,* longer haired distally but with few hairs longer than 30; feet, ventral side of tail white; head and body length about 170, thus smaller than any chinchillid 30

30(29) Large, head and body longer than 350 mm; skull longer than 64 31

Smaller, head and body shorter than 350; skull shorter than 64 mm 33

31(30) Pelage includes heavy sharp quills; skull bulges upward between eyes (fig. 56); tail prehensile, with special hairless area on top near end (fig. 57) .... **Family Erethizontidae,** Key 28



Pelage without quills; skull relatively flat on top; tail not prehensile; if haired, not with special hairless area at end .. 32

32(31) Brown, not spotted; tail conspicuously scaled, more than half as long as head plus body; five hind toes, webbed, except the fifth toe (fig. 58) ... **Family Myocastoridae, *Myocastor coypus***

Brown or black, with whitish spots and stripes (fig. 59); scales of tail concealed by hair, tail less than half the length of head and body although longer than hind foot; four toes on each foot, unwebbed .... **Family Dinomyidae, *Dinomys branickii***

33(30) Upper cheek teeth relatively simple, shaped like figure eight, or a rounded "L," enamel around edges of flattened occlusal surface only (fig. 60) .... **Families Abrocomidae and Octodontidae,** Key 25

Upper cheek teeth more complex, not as above, with enamel folds and isolated enamel islands in middle of occlusal surface (fig. 61B; fig. 61A shows skull of *Proechimys*) and rooted (not persistently growing) .... **Family Echimyidae,** Key 24

[Key to Chiroptera begins here]

34(2) With distinct nose leaf (fig. 62; reduced in *Sphaeronycteris* [fig. 160] and in vampire bats [Desmodontinae], which have large, sharp-edged, pointed, cutting upper incisors [fig. 64]) .... **Family Phyllostomidae,** Key 6

Without nose leaf (fig. 63) and with upper incisors not as described for vampires 35

35(34) Tail relatively heavy and extending noticeably beyond edge of interfemoral membrane (fig. 65); membranes thick; legs relatively short; feet heavy, hairs extend beyond claws of toes, no suction discs on feet .... **Family Molossidae,** Key 9

Tail absent or present but not as above (although it may project above surface of interfemoral membrane or slightly beyond its edge, the latter in *Thyroptera*,which have suction discs on feet) 36

36(35) Gap between premaxillary bones at front of skull (fig. 66), incisors of right and left well separated; no discs on base of thumb or sole of hind foot 37

No distinct gap between premaxillary bones (fig. 67), incisors relatively close together at midline; may or may not have discs on thumb and hind foot 38

37(36) Pocket may be present in leading wing membrane (fig. 69); sometimes skull has distinct postorbital process (fig. 68 arrow); hind leg slender; end of tail projecting above upper surface of middle of interfemoral membrane or tail mostly ventral to this membrane .... **Family Emballonuridae,** Key 3

No pocket as described; never has distinct postorbital process; hind leg moderate in build; tail reaching to edge of wide interfemoral membrane .... **Family Vespertilionidae,** Key 8

38(36) Distinct suction discs on base of thumb (fig. 70) and sole of hind foot; (in the two species now known from Bolivia) size small, head and body shorter than 75 mm .... **Family Thyropteridae,** Key 7

No suction discs; size medium, head and body longer than 75 39

39(38) Hind feet enlarged (longer than 19 mm); lips full (fig. 71); skull relatively broad (width more than half of length) ....**Family Noctilionidae,** Key 4

Hind feet shorter than 19; lips not full (fig. 72); skull relatively narrow (width less than half of length) .... **Family Mormoopidae,** Key 5

[Order Primates begin here]

40(18) Large; bipedal; tailless; only two upper and two lower premolars on each side (fig. 73, shows upper teeth) .... **Family Hominidae, *Homo sapiens***

Small to medium (up to 675 mm in length of head and body); tail conspicuous; three upper and three lower premolars on each side (fig. 74, shows upper teeth) .... **Families Callitrichidae and Cebidae,** Key 9

KEY 2

GENERA AND SPECIES OF DIDELPHIDAE IN BOLIVIA

1 Tail length ranges from nearly as long as to much longer than head and body; size varies, large or small 6

Tail about half of length of head and body; skull always shorter than 45 mm; hind foot shorter than 30 mm; head and body always shorter than 200 mm .... ***Monodelphis,*** 2

[*Monodelphis* is poorly known; for additional notes see text]

2(1) Head and body longer than 100 mm; skull longer than 30 mm; hind foot longer than 17 3

Head and body shorter than 100; skull shorter than 30; hind foot shorter than 17 5

3(2) Tail furred ...... ***Monodelphis emiliae***

Tail not furred throughout its length .. 4

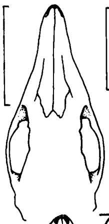
4(3) Lateral pelage rusty and contrasting sharply with grayish dorsal pelage; hind foot about 21 mm long .... ***Monodelphis brevicaudata***

Lateral pelage not rusty but gray or yellowish and blending into mid dorsal pelage color; hind foot about 19 .... ***Monodelphis domestica***

5(2) Rostrum slender (fig. 75); larger, skull longer than 23.5 in adults, head and body longer than 75 .... ***Monodelphis adusta* or *M. osgoodi***

Rostrum less slender (fig. 76); smaller, skull shorter than 23.5; head and body shorter than 75 .. ***Monodelphis kunsi***

6(1) Fur intermixed with long (more than 20 mm) coarse guard hairs projecting beyond the woollier, softer underhairs; larger as adults, skull longer than 83 .... ***Didelphis,*** 7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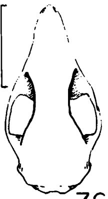
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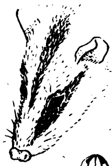
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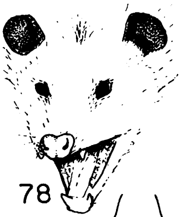
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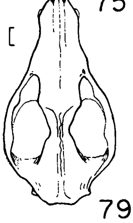
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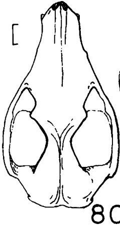
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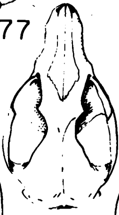
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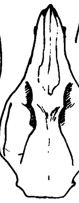
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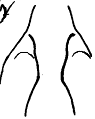
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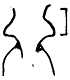
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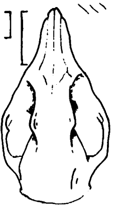
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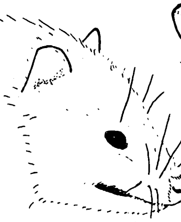
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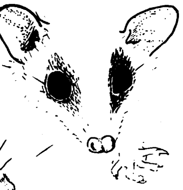
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Fur not as above (few if any hairs longer than 20); smaller as adults, skull shorter than 83 8

7(6) Ears usually white, at least at edges; face with contrasting blackish (crown, band through each eye) and whitish areas (fig. 77); skull usually more slender for a given age and sex (fig. 79, adult male) .... ***Didelphis albiventris***

Ears usually black; face without much contrast between darker and lighter areas (fig. 78); skull less slender (fig. 80, adult male) ... ***Didelphis marsupialis***

8(6) Webs between toes of hind feet; fur of back with striking pattern of dark midline stripe and saddle like blotches; skull relatively broad (fig. 81) .... ***Chironectes minimus***

No webs between toes of hind foot; fur of back not as above, more or less uniform in color; skull relatively narrow (figs. 82, 83) 9

9(8) Distinct pale spot in blackish surroundings above each eye 10

Not as above 11

10(9) Pelage dark gray or blackish and extending for about 50 to 75 mm on the tail;

bottom of tail near base fully haired; distinct supraorbital processes (fig. 82) .... ***Philander opossum***

Pelage usually brownish and extending less than 30 on the tail; tail essentially naked below from anus to tip (tail relatively longer and more slender and feet more slender, but direct comparison needed to visualize these); no distinct supraorbital processes (fig. 83) .... ***Metachirus nudicaudatus***

11(9) Middorsal streak present on head from muzzle to between ears, dark with paler areas on either side, or pale with dark areas on either side 12

No distinct facial streak 14

12(11) Middorsal facial streak dark; tail not haired for entire length; head and body of adults longer than 210 mm; hind foot about 40 in adults; supraorbital processes large and projecting (fig. 84) .... ***Caluromys*** 13

Middorsal facial streak grayish; tail densely haired for its entire length; head and body shorter than 210; hind foot about 30; supraorbital processes in form of conspicuous shelf over each orbit (fig. 85) .... ***Glironia venusta***

13(12) More than half of length of dorsal surface of tail well haired .... ***Caluromys lanatus***

Less than half (about one-third) of length of dorsal surface of tail well haired .... ****Caluromys philander***

14(11) Ears short, rounded, barely projecting above fur; ears laid forward, reaching barely half the distance to the eyes (fig. 86); eyes relatively far forward on head; snout short ...... ***Lutreolina crassicaudata***

Ears longer, clearly projecting beyond fur; ears laid forward, reaching beyond half the distance to the eyes (fig. 87) (the following key to "*Marmosa*," now divided into five genera, modified from that of Tate, 1933) 15

15(14) Scales on tail annular and posterior margin of each scale; scale nearly straight (fig. 88); mammae both pectoral and abdominal; bullae relatively large (fig. 90A); postpalatal bridge narrow (fig. 90B), palate highly fenestrated, lateral foramina large (fig. 90C); pattern of pelage usually tricolored, sides demarcated relatively sharply from both back and belly; tail short, thickened with fat in some seasons; ears relatively larger (17 to 26 mm long); feet relatively smaller (14 to 17), ear is usually more than 1.35 times the length of hind foot .... ***Thylamys***, 16

Scales arranged spirally and are generally rhomboidal (fig. 89); mammae abdominal; bullae smaller (fig. 91A); postpalatal bridge broader (fig. 91B); palate usually less fenestrated (fig. 91C); tricolor pattern not developed; tail variable in length, never incrassated; ear length usually less than 1.35 times length of hind foot 18

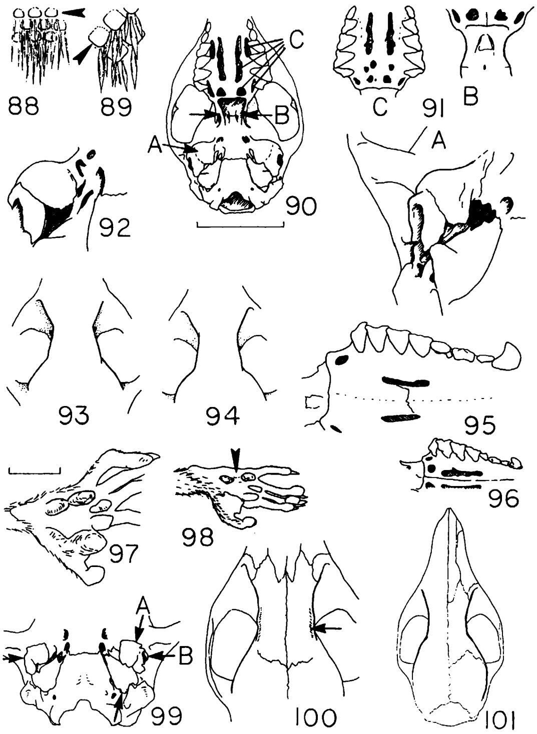
16(15) Dorsally grayish; bullae especially large (fig. 90A) 17

Dorsally brownish; bullae not so large (fig. 92) .... ***Thylamys venustus***

17(16) Braincase relatively larger; interorbital region not so narrow (fig. 93) .... ***Thylamys pallidior***

Braincase relatively small; interorbital region narrow (fig. 94) .... ***Thylamys pusilla***

18(15) Large to moderate in size (head and body 150 to 180 mm in length, skull longer than 38); fur grayish, often rather woolly; feet (hind foot length 24 to 29) and claws large and strong; external anterior and posterior pads of hind foot united (fig. 97); tail long (190 to 220); scales spiral, 9 to 14 rows per cm of tail



length; skull strongly ossified; bullae small (2.9 to 3.3 mm across); postpalatal bridge broad (4.2 to 4.6); greatest width across bullae (fig. 99B) more than 2.13 times inclusive distance across bulla and petrosal bone (fig. 99A); teeth large (maxillary tooth row, M1 through M3, 7.0 or more) .... ***Micoureus***, 19

Small to moderate in size; fur rarely gray, never woolly; feet and claws smaller; pads separate (fig. 98); tail seldom very long; scales more than 16 per cm; skull strongly to slightly ossified; bullae larger; bridge narrower; ratio lower; teeth smaller 20

19(18) Pelage long (longest dorsal hairs about 15 mm), somewhat waved, brownish gray, most ventral hair basally gray .... ***Micoureus regina***

Pelage shorter (longest dorsal hairs about 12 or 13 mm), straighter, less dark brownish, ventrally ochraceous, with few gray-based hairs .... ***Micoureus constantiae***

20(18) Feet relatively small, never very broad; pad at base of digits 3 and 4 of hind foot considerably smaller than that of digits 2 and 3; the three minute hairs accompanying each caudal scale flattened, appressed, provided with a median dorsal keel, somewhat petiolate at the insertion, often black; skull narrowed; nasals exceeding premaxillae anteriorly, base of nasala at maxillofrontal suture very little or not at all expanded; no pointed supraorbital processes; teeth often small .... ***Marmosops***, 21

Feet proportionally larger, or if short, then rather broad; pads at base of digits 2 and 3 and of 3 and 4 subequal; caudal scale hairs not as described above, rarely black; skull usually broader; nasals never exceeding premaxillae anteriorly; base of nasals at maxillofrontal suture abruptly expanded; pointed supraorbital processes present although sometimes small; teeth proportionally larger .. 23

21(20) Size small (total length less than 215 mm, generally 180 to 190) .... ***Marmosops impavida* or *M. parvidens***

Size moderate to large; teeth larger (M1–M3 more than 6.1) 22

22(21) Large; fuscous, reddish, or brown, never grayish; tail long, brownish; ventral white area sometimes narrowed by gray-based hairs; ears small to medium; skull with supraorbital beading (fig. 100) .... ***Marmosops noctivaga***

Moderate in size; brownish gray; hairs long, coarse, lusterless; white area of underparts not narrowed by lateral or gray-based hairs, white area about 30 mm wide; ears large; no supraorbital beading (fig. 101) .... ***Marmosops dorothea***

23(20) Relatively unfenestrated palate (fig. 95); mammae abdominal ... ***Marmosa***, 24

Fenestrae large (fig. 96); both pectoral and abdominal mammae present .... ***Gracilinanus***, 25

24(23) Larger, head and body longer than 120 mm; M1–M3 longer than 5.3 .... ***Marmosa murina***

Smaller, head and body shorter than 120; M1–M3 shorter than 5.3 .... ***Marmosa lepida***

25(23) Brownish gray above, buffy white below; dorsal surface of shank same color as hind foot .... ***Gracilinanus agilis***

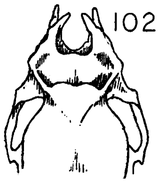
Deep cinnamon color above, cinnamon washed below; dorsal surface of shank deep fuscous, hind foot buffy brown; guard hairs numerous .... ***Gracilinanus aceramarcae***

KEY 3

GENERA AND SPECIES OF EMBALLONURIDAE IN BOLIVIA

The sac-winged bats or Emballonuridae are relatively small bats (forearm up to 66 mm long) without special outgrowths on muzzle. The second digit of wing has no phalanges and the third has two phalanges, of which the proximal is flexed upon dorsal surface of metacarpal when at rest. The tail projects above the uropatagium or interfemoral membrane, not from its free edge. The premaxillae are incomplete and the first upper incisors widely separated. An opening is often present on the propatagium near the elbow, from which an odoriferous substance is secreted.

1 Postorbital processes obscured by wide supraorbital ridges (fig. 102); wing sac, if present, opening on ventral surface of wing; color white; fur long and silky; thumb very short and mostly contained in membrane, first phalanx shorter than metacarpal, claw rudimentary; distinct pouches on lower side of uropatagium (fig. 103);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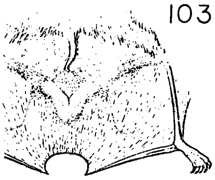
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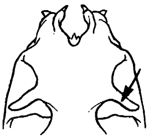
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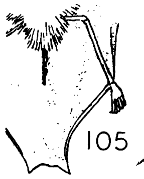
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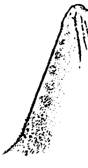
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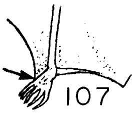
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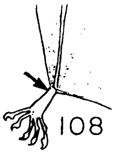
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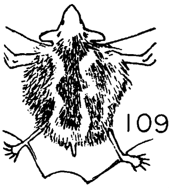
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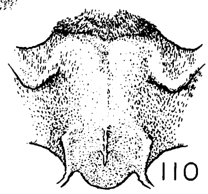
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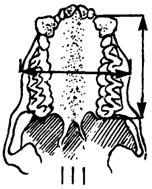
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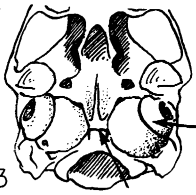
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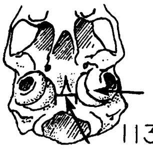
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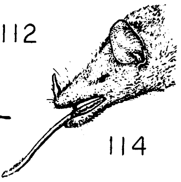
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tail mostly ventral to this membrane . . . . ***Subfamily Diclidurinae,** 2

Postorbital processes long and curved (often broken off in cleaning skulls, fig. 104); sac, if present, opening on dorsal surface of wing; color not white; fur not long and silky; thumb not mostly contained in membrane, its first phalanx about as long as metacarpal, its claw not rudimentary; no pouches on lower side of uropatagium; tail lies within uropatagium for most of the tail's length . . . . **Subfamily Emballonurinae,** 3

2(1) Forearm 60 to 69 mm long; maxillary tooth row length 7.5 to 8.4 . . . . ****Diclidurus albus***

Forearm 70 to 73; maxillary tooth row length 9.4 to 9.6 . . . ****Diclidurus ingens***

3(1) Calcar much longer than tibia (fig. 105), about half the length of forearm; wing sac absent; small tufts of whitish fur along the forearm (fig. 106), dorsal pelage grizzled (silvery tips of hairs on darker background) . . . . ***Rhynchonycteris naso***

Calcar equal to tibia or shorter; wing sac usually present; no tufts of whitish hair along forearm; pelage not grizzled as noted 4

4(3) Wing membrane attaches to foot near base of outer toe (fig. 107); mesopterygoid fossa broad in front, a median projection at back of palate . . . . ****Cormura brevirostris***

Wing membrane attaches to foot near ankle (fig. 108); mesopterygoid fossa narrowed in front, no medianposterior palatal projection 5

5(4) Dorsal surface with two more or less distinct wavy longitudinal pale lines on darker background (fig. 109); wing sac close to forearm near elbow; upper surface of rostrum of skull with a slight median groove . . . . ***Saccopteryx,*** 6

Dorsal lines absent; wing sac small and near anterior border of antebrachial membrane; upper part of rostrum inflated, convex, no median groove . . . . ***Peropteryx,*** 7

6(5) Dorsally black (or in worn pelage brownish); wing membranes black; wing sac, at least in males, remarkably large; forearm longer than 43 mm; length of upper tooth row (C–M3) more than 6.7 . . . . ***Saccopteryx bilineata***

Dorsally brown; wing sac not large; forearm shorter than 43; tooth row shorter than 6.7 . . . . ***Saccopteryx leptura***

7(5) Forearm usually longer than 45 mm; skull longer than 16; upper tooth row (C–M3) longer than 6.5; width across molars greater than 6.9 . . . . ***Peropteryx kappleri***

Forearm usually shorter than 45; skull shorter than 16; tooth row shorter than 6.5; width across molars less than 6.9 . . . . ***Peropteryx macrotis***

KEY 4

SPECIES OF NOCTILIONIDAE IN BOLIVIA

Enlarged hind limbs enable Noctilionidae or bulldog bats to catch and eat insects and small fish. The hind feet are more than half the length of the tibia. This family has only one genus and two species. Upper lips are large and form a hood over the mouth. Ears are long and pointed. Fur is short and often brightly colored. Wing membranes are attached to the back somewhat above the usual lateral position. Skull is broad and has a sagittal crest.

1 Forearm longer than 70 mm; combined length of tibia and hind foot relatively longer, over 70% of the length of forearm; hind foot longer than 30 . . . . ***Noctilio leporinus***

Forearm shorter than 70; length of tibia and hind foot less than 70% of length of forearm; hind foot shorter than 30 .... ***Noctilio albiventris***

KEY 5

SPECIES OF MORMOOPIDAE IN BOLIVIA

This family was separated from the Phyllostomidae by Smith (1972). Lower lip with platelike outgrowths.

1 Wing membranes originating on middorsal line (fig. 110), giving a naked-backed appearance; rostral breadth (fig. 111) always greater than length of maxillary tooth row (fig. 111) .... **Subgenus *Pteronotus, Pteronotus gymnonotus***

Wing membranes not originating on middorsal line but from more lateral position; rostral breadth equal to or less than length of maxillary tooth row 2

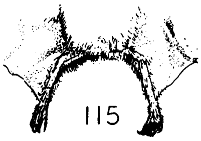
2(1) Basioccipital narrowly constricted between auditory bullae (fig. 112); condylobasal length more than 16 mm; forearm longer than 50; tympanic ring covering about one-third of auditory bulla (fig. 112) .... **Subgenus *Phyllodia, Pteronotus parnellii***

Basioccipital not narrowly constricted between auditory bullae (fig. 113); condylobasal length less than 16; forearm shorter than 50; tympanic ring covering more than half of auditory bulla (fig. 113) .... **Subgenus *Chilonycteris, Pteronotus personatus***

KEY 6

GENERA AND SPECIES OF PHYLLOSTOMIDAE IN BOLIVIA

The American leaf-nosed bats of the family Phyllostomidae usually have a vertically projecting flaplike nose leaf (reduced in some genera). They lack the postorbital processes seen in most emballonurid skulls and the chin flaps of the mormoopids. The premaxillae are complete and fused to each other and to the maxillae,and their palatal branches isolate two lateral foramina. The second finger has a well-developed metacarpal and a small phalanx e third finger has three bony phalanges.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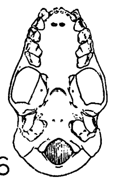
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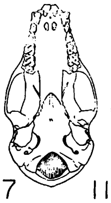
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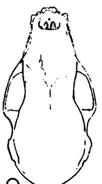
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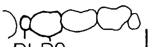

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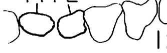
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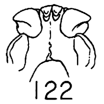
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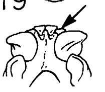
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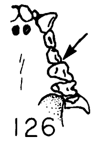
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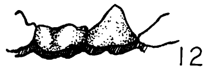
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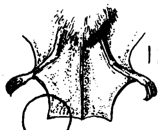
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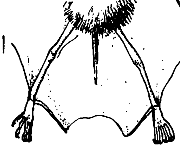
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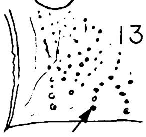
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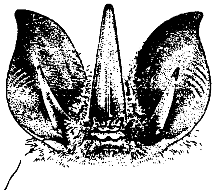
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1 Upper incisors are large, pointed, sharp-edged bladelike teeth (fig. 64); postcanine teeth reduced in number to two or three pairs above and below and all reduced in size, smaller than the upper incisor or canine; nose leaf reduced to dermal ridges above nostrils .... **Subfamily *Desmodontinae*, 36**

Upper incisors not as above; postcanine teeth not both fewer than four in a tooth row and all smaller than any upper canine or incisor 2

2(1) Tongue very long (fig. 114); upper surface of lower lip in the center divided by deep groove; head long and narrow (width less than 46% of length); cusps and commissures of upper molars often so reduced that the W-pattern is absent 29

Tongue not unusually long; upper surface of lower lip not divided by a deep groove; head width greater than 46% of head length; cusps and commissures of upper molars variable, often with W-pattern evident 3

3(2) Interfemoral membrane reduced to a very narrow band along legs and posterior part of body and covered with fine prominent hair; calcar indistinct or absent; no tail evident (fig. 115); crown of molars with distinct longitudinal groove .. ***Sturnira*, 61**

Interfemoral membrane not as above, but moderately or well developed at least laterally; calcar distinct; tail present or absent; crown of molars not as described above 4

4(3) Muzzle short and broad; no external tail; tooth rows arcuate (fig. 116) . . . . **Subfamily Stenodermatinae, 38**

Muzzle not so short and broad; tail distinct; tooth rows not distinctly arcuate (fig. 117) 5

5(4) Zygomatic arches incomplete (fig. 118); upper molars narrow and without W-pattern; two lower premolars; chin with large rounded protuberance in the center surrounded by two or more bumps (several smaller ones in *Carollia* or a larger one on either side in *Rhinophylla*) . . . . **Subfamily Carolliinae, 6**

Zygomatic arches complete (fig. 119); upper molars with W-pattern; chin without large rounded protuberance in center . . . . **Subfamily Phyllostominae, 9**

6(5) First upper premolar much smaller than the second (fig. 120); third upper molar (M3) oval and mostly horizontal, with reduced cusps (fig. 120); teeth generally simplified; tail absent; tips of dorsal hairs slightly darkened; size small, forearm shorter than 37.5 mm . . . . ***Rhinophylla pumilio***

First upper premolar approximately the same size as the second (fig. 121); M3 not oval and with more distinct cusps (fig. 121); tail present; tips of dorsal hairs distinctly darker than more proximal parts of hairs, either reddish or dark gray; forearm longer than 33.5 . . . . ***Carollia*, 7**

7(6) Lower jaw viewed from above has outer incisors obscured by cingula of canines (fig. 122) and/or upper tooth row straight (fig. 124); forearm longer than 41.3; condylobasal length more than 20 . . . . ***Carollia perspicillata***

Lower jaw viewed from above has outer incisors visible (fig. 123); upper tooth row bowed in or with distinct notch or "step" in labial outline (figs. 125, 126; forearm length less than 41.8; condylobasal shorter than 20 8

8(7) Labial outline of upper tooth row has distinct notch or step, owing to labial side of second premolar being more lingual than labial edge of first molar (fig. 125); second lower premolar (p2) about twice as high as first molar, occlusal surface of first lower molar (m1) with straight profile (fig. 127); forearm shorter than 37.5 mm; condylobasal length less than 18 . . . . ***Carollia castanea***

Labial outline of upper tooth row evenly curved (fig. 126); p2 not about twice as high as m1, surface of m1 with discrete cusp or cusps (fig. 128); forearm longer than 37.5; condylobasal length more than 18 . . . . ***Carollia brevicauda***

[Phyllostominae begin here]

9(5) External tail absent or rudimentary; forearm longer than 75 mm 10

Tail present; forearm usually shorter than 75 mm 11

10(9) Two lower incisors; tail rudimentary; forearm 77 to 83 mm long . . . . ***Chrotopterus auritus***

Four lower incisors; no tail; forearm about 105 . . . . ***Vampyrum spectrum***

11(9) Tail in membrane and extending to its border (fig. 129) 12

Tail short and not reaching beyond the middle of the membrane (fig. 130; in some species end of tail projects above the membrane) 13

12(11) Forearm shorter than 43 mm (usually 34 to 39); distal part of uropatagium with peculiar dermal papillae in longitudinal rows, most evident ventrally (fig. 131); wing membrane from distal half of tibia; calcar about same length as tibia; nose leaf less than 15 high . . . . ***Macrophyllum macrophyllum***

Forearm longer than 43 (usually 47 to 52); uropatagium without peculiar papillae; wing membrane from ankle opposite calcar; calcar about two-thirds as long as tibia; nose leaf more than 15 high (fig. 132) . . . . . . ***Lonchorhina aurita***

13(11) Two lower incisors (i.e., one pair) . . 14

Four lower incisors 18

14(13) Nose leaf more than half as long as ear . . . . ***Mimon crenulatum***

Nose leaf less than half as long as ear . . . . ***Tonatia*, 15**

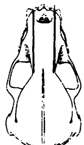
15(14) Forearm shorter than 40 mm; condylobasal length of skull less than 19 . . . . ***Tonatia brasiliense***

Forearm longer than 40; condylobasal length of skull more than 19 16

16(15) Forearm shorter than 49 mm; condylobasal length of skull less than 22 . . . . ***Tonatia carrikeri***

Forearm longer than 49; condylobasal length of skull more than 22 17

17(16) Ears connected by a low, but often indistinct, band; ear length 33 mm or more (measured from basal notch to tip); postorbital area of skull very constrict-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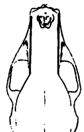
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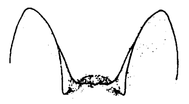
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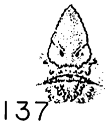
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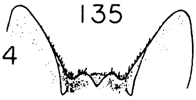
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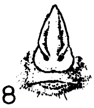
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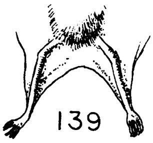
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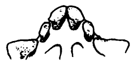
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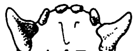
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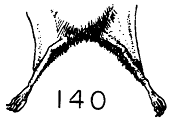
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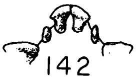
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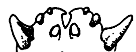
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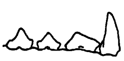
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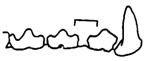
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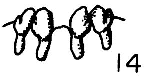
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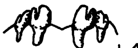
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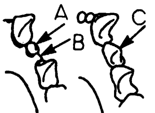

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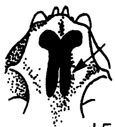
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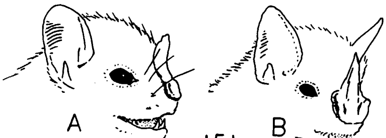

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ed, much narrower than width of rostrum just above base of canines (fig. 133); forearm nearly naked .... *Tonatia sylvicola*

Ears completely separate; ear length 32 or less; postorbital constriction poorly developed, about the same as the width of the rostrum just above the base of the canines (fig. 134); forearm furry .... *Tonatia bidens*

18(13) Forearm shorter than 60 mm .... *Micronycteris*, 19

Forearm longer than 60 25

19(18) Ears connected by high, notched, often indistinct band, P3 about same size as P4 20

Ears connected by low, unnotched band or band absent, P3 and P4 not equal in size 23

20(19) Forearm longer than 40 mm 21

Forearm shorter than 40 .... **Subgenus *Micronycteris*, 22**

21(20) Two pairs of upper incisors .... ***Micronycteris (Xenoctenes) hirsuta***

One pair of upper incisors .... ***Micronycteris (Barticonycteris) daviesi***

22(20) Interauricular band slightly notched medially (fig. 135); venter brown; calcar distinctly longer than hind foot; length of interfemoral membrane more than twice length of tail; upper premolars (P3, P4) about equal in height .... *Micronycteris megalotis*

Interauricular band deeply notched medially (fig. 136); venter gray-white; calcar shorter than hind foot; length of uropatagium less than twice length of tail; P3 distinctly lower than P4 .... *Micronycteris minuta*

23(19) Third metacarpal longest .... *Micronycteris nicefori*

Fifth metacarpal longest 24

24(23) Forearm longer than 42.5 mm .... ****Micronycteris behni***

Forearm shorter than 42.5 .... ****Micronycteris sylvestris***

25(18) Nose leaf with margin of lancet finely toothed (fig. 137) .. *Trachops cirrhosus*

Nose leaf with margin entire (fig. 138) 26

26(25) Calcar distinctly shorter than hind foot *and* forearm longer than 67 mm .... *Phyllostomus stenops*

Not as above 27

27(26) Forearm longer than 75 mm; condylobasal length more than 30; zygomatic breadth more than 18 *Phyllostomus hastatus*

Forearm shorter than 75; condylobasal length less than 30; zygomatic breadth less than 18 28

28(27) Sagittal crest absent or weakly developed; calcar about one-half of length of tibia and shorter than hind foot .... *Phyllostomus discolor*

Sagittal crest well developed; calcar over three-quarters of length of tibia and longer than hind foot .... *Phyllostomus elongatus*

[Glossophaginae-Lonchophyllinae begin here]

29(2) Interfemoral membrane extending to about ankle (fig. 139); p2/3 30

Interfemoral membrane very narrow, extending to just below knee (fig. 140) except in *A. caudifer*; dental formula i2/0, c1/1, p3/3, m3/3 .... ***Anoura*, 34**

30(29) Lower incisors present; dental formula i2/2, c1/1, p2/3, m3/3 31

Lower incisors, at least in adults, absent 33

31(30) Upper incisors of almost equal size, forming continuous row almost from canine to canine (fig. 141); zygomatic arch complete ..... *Glossophaga soricina*

Outer upper incisors conspicuously smaller than inner ones and separated by spaces from these and from canines (fig. 142); zygomatic arch incomplete . . 32

32(31) Base of hairs darker than the tips; upper premolars with rounded bases, projecting, and of equal size . . . . ***Lionycteris spurrelli***

Basal two-thirds of hairs pale buffy white, distinctly paler than the brown tips; upper premolars with bases elongate, narrow, and unequal in size . . . . ***Lonchophylla thomasi***

33(30) Upper incisors evenly and widely spaced between canines (fig. 143); wing membrane from base of outer toe; dental formula i2/0, c1/1, p2/3, m2/2 . . . . ***Lichonycteris obscura***

I1 and I2 separated by a distinct space from each other and from canines (fig. 144); wing membrane from foot proximal to base of outer toe; dental formula i2/0, c1/1, p2/3, m3/3 . . . . (see text), ***Choeroniscus***

34(29) Distinctive p1, larger than others, bladelike (fig. 145); upper canine large and with longitudinal sulcus on anterior face . . . . ***Anoura cultrata***

Premolars much alike, p1 not enlarged or bladelike (fig. 146); upper canine not enlarged and its anterior face flat 35

35(34) Interfemoral membrane about 1.5 to 4 mm wide, 1.5 at midline, furred dorsally, with dense fringe of hairs on free margin; tail absent; forearm length 40 to 48; skull length 24 to 27; P4 with medial internal cusp; M2 with anterointernal cusp and crest; zygomatic arch sometimes incomplete; calcar not evident . . . . ***Anoura geoffroyi***

Interfemoral membrane width 3.5 to 5 at midline; tail present; forearm 35 to 40; skull 21 to 24; P4 without median internal cusp; M1 without anterointernal cusp and crest; arch usually complete; calcar about 3 to 4 . . . . . . ***Anoura caudifer***

[Desmodontinae begin here]

36(1) Interfemoral membrane rudimentary, confined to mere fringe along legs, with rather long hairs; two pair of upper incisors, outer upper incisor minute, near middle of inner side of canine; one lower premolar and two lower molars on each side . . . . ***Diphylla ecaudata***

Interfemoral membrane moderately developed, when stretched its middle part reaches distinctly below knees; one pair of upper incisors, two lower premolars and one lower molar on each side . . . . ***Desmodus***, 37

37(36) Wing tips white between digits 3 and 5 and from second phalanx to margin; length of thumb distinctly less than that of the hind foot; three upper cheekteeth; forearm about 53 mm long; lower inner incisors entire, outer incisors bilobed (fig. 147) . . . . ***Desmodus youngii***

Wings without white tips; thumb about as long as hind foot; two upper cheekteeth; forearm usually longer than 55; all lower incisors bilobed (fig. 148) . . . . ***Desmodus rotundus***

[Stenodermatinae begin here]

38(4) First lower premolar relatively small (less than one-third the occlusal area of next premolar, fig. 149A, separated by a distinct gap from the next premolar (fig. 149B) *and* with greatest breadth across lower canines more than 2.8 mm; narrow nasal emargination extending back to, or nearly to, level of orbit (fig. 150); eyes relatively large (fig. 151A) . . . . ***Chiroderma***, 39

First lower premolar more than one-third the occlusal area of next premolar, no gap between these two teeth (fig. 149C; or if a gap present, then breadth across lower canines less than 2.8, otherwise breadth more than 2.8); no narrow nasal emargination; eyes not so enlarged (fig. 151B) 41

39(38) Larger, skull longer than 24 mm; forearm longer than 44; zygomatic breadth more than 14.5 40

Smaller, skull shorter than 24; forearm shorter than 44; zygomatic breadth less than 14.5 . . . ***Chiroderma trinitatum***

40(39) With middorsal whitish stripe; skull longer than 26 mm; forearm longer than 50; calcar longer than 8 . . ***Chiroderma salvini***

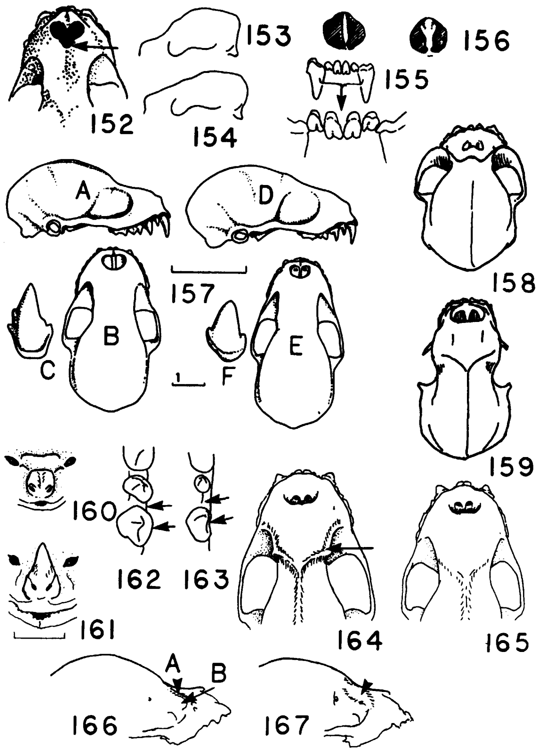
Without middorsal stripe; skull shorter than 26; forearm shorter than 50; calcar shorter than 8 . . ***Chiroderma villosum***

41(38) Without middorsal stripe 51

With middorsal stripe 42

42(41) Interfemoral membrane at midline extends beyond body about 10 mm; inner upper incisors bilobed and lobes about equal in size (lateral may be somewhat smaller) 43

Interfemoral membrane does not extend appreciably beyond body at midline; inner upper incisors not bilobed, or if bi-



lobed, the lateral lobe much smaller than medial lobe; nasal opening heart-shaped; dorsal rim with medial emargination (fig. 152) 45

43(42) Small, forearm about 39 mm long; I1 more than twice the height of I2 and converging distally; two lower incisors .... ***Vampyressa bidens***

Larger, forearm 41–46; I1 less than twice the height of I2; four lower incisors .. .. ***Uroderma***, 44

44(43) Rostrum narrower and depressed in dorsal profile (fig. 153); mesethmoid narrow (fig. 155A); facial stripes contrasting with dark color of head; ear edged with yellowish white (bright yellow in life); pelage grayish brown .... ***Uroderma bilobatum***

Rostrum heavy and deep, dorsal profile of skull from crown to tip of snout nearly straight (fig. 154); mesethmoid markedly expanded laterally (fig. 156); facial stripes poorly developed; conch of ear without white or yellowish edging; pelage yellowish brown .... ***Uroderma magnirostrum***

45(42) Dorsal pelage a rich reddish brown and with a very conspicuous white middorsal stripe; no small third upper molar (M3), last lower molar (m3) relatively small, its length about one-third or less the length of the large adjacent molar .... ***Vampyrodes caraccioli***

Dorsal pelage brown but less reddish and middorsal stripe less conspicuous because narrower; small m3 present; m3 length more than one-third the length of m2 .... ***Platyrrhinus***, 46

46(45) Larger, forearm longer than 53 mm, skull longer than 30, head and body longer than 81 47

Smaller, forearm shorter than 54, skull shorter than 30, head and body shorter than 81 48

47(46) Pelage paler, lacking frosted appearance of underparts, dorsal and facial stripes inconspicuous, reduced fringe of hairs along trailing edge of uropatagium, tips of wings pale; occlusal outline of m3 longer than broad; skull shorter than 32 mm .... ***Platyrrhinus infuscus***

Pelage dark blackish brown, dorsal stripes prominent, fringe of hairs conspicuous, ventral pelage with hairs tipped in grayish-white; skull longer than 32; condylobasal length greater than 29; occlusal outline of m3 broader than long .... ***Platyrrhinus vittatus***

48(46) Size small, head and body shorter than 61 mm, forearm length 42 or less; condylobasal length of skull less than 20.1, skull shorter than 23.5; more or less dense fringe of hairs on free edge of uropatagium 49

Size larger, head and body longer than 61, forearm length 40 or more; condylobasal length of skull more than 20, skull longer than 23.5; without dense fringe of hairs on free edge of uropatagium 50

49(48) Two accessory cusps on anterior margin of p2 (fig. 157C); darker; rostrum shorter and broader (fig. 157B); cranium more inflated; zygoma wider; rostral depression in profile view greater (fig. 157A) .... ***Platyrrhinus brachycephalus***

Usually only one accessory cusp on p2 (fig. 157F); skull seems relatively more slender (fig. 157E); rostral depression less pronounced (fig. 157D) .... ***Platyrrhinus helleri***

50(48) Pelage dark, two conspicuous buffy facial stripes, less dense fringe on uropatagium; skull longer than 26.5 mm; m2 with conspicuous cuspule between protoconid and metaconid, m3 with well-developed labial cingulum .... ***Platyrrhinus dorsalis***

Pelage not usually so dark (except in *nigellus*), four conspicuous white facial stripes (except in *nigellus* where they are present but medial pair buffy and poorly defined and lateral pair obsolete), denser fringe of hairs on uropatagium; skull shorter than 26.8; m2 without cuspule, m3 without cingulum .... ***Platyrrhinus lineatus* (including *Platyrrhinus nigellus*)**

51(41) Distinct white spot (several millimeters across) at base of leading edge of wing; face peculiar in being either unusually short, concave (fig. 158), and with circular nose leaf, or in being very heavy, cuboid, and broad in rostrum (fig. 159) 52

No distinct white spot at base of wing; face not as above 53

52(51) Face short, rostrum depressed into facial concavity (fig. 158); nose leaf rounded (fig. 160) .... ***Sphaeronycteris toxophyllum***

Face with large cuboid rostrum (fig. 159); nose leaf pointed at top (fig. 161) .... ***Pygoderma bilabiatum***

53(51) Skull relatively more delicate, mastoid breadth less than 9 mm; breadth across upper canines at cingulum less than 4.7; first and second upper incisors differentiated—first more than twice the height of second, medially convergent, and bilobed or not; second bilobed or not 54

Skull relatively more massive, mastoid breadth more than 9; breadth across canines at cingulum more than 4.7; I1 bilobed until well worn ... ***Artibeus*, 55**

54(53) Face with dark eye stripe and paler stripes above and below it; teeth larger, gap behind first lower premolar inconspicuous (fig. 162), less than half the length of that tooth; first molar not noticeably narrower than long (fig. 162) .... ***Vampyressa pusilla***

Face without distinct stripes; margins of ear yellowish; teeth relatively small and delicate, gap behind first lower premolar at least half its length (fig. 163); first molar above and below much longer than wide (fig. 163) .... ***Mesophylla macconnelli***

55(53) Larger, forearm longer than 55 mm; skull longer than 24; canine breadth (between outer edges of cingula of right and left upper canines) more than 7 56

Smaller, forearm shorter than 55; skull shorter than 24, canine breadth less than 7 58

56(55) Blackish, relatively uniform in color, no conspicuous facial stripes; forearm shorter than 63 mm; skull shorter than 28.5; canine breadth less than 8.4 .... ***Artibeus obscurus***

Brownish, with pale supraorbital stripes; forearm longer than 63, skull longer than 28.5, canine breadth more than 8.4 57

57(56) Facial stripes nearly white, very conspicuous; forearm longer than 68 mm; third upper molar absent; supraorbital rim elevated and postorbital process conspicuous (fig. 164) ... ***Artibeus lituratus***

Facial stripes grayish, not so strikingly in contrast with adjacent areas of face; forearm shorter than 68; third upper molar usually present; supraorbital rim not noticeably elevated and postorbital process less conspicuous (fig. 165) ... . ***Artibeus jamaicensis fallax***

58(55) Smaller, forearm 41 mm or shorter; skull shorter than 20; canine breadth less than 5.5; no third upper molar 59

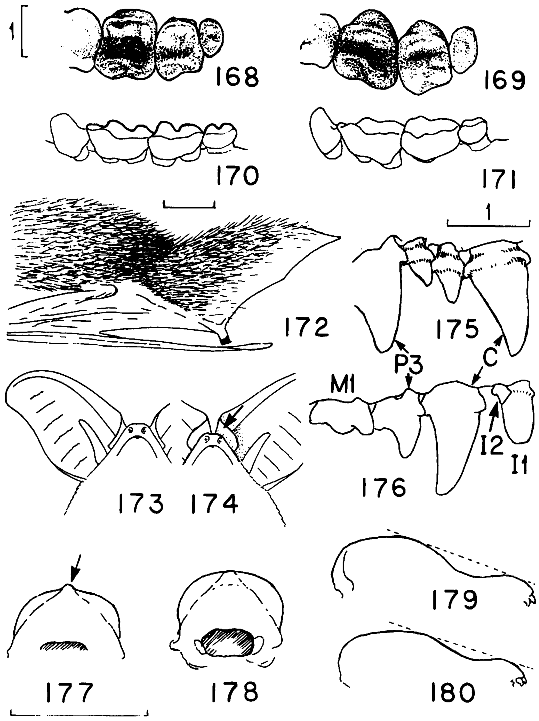
Larger, forearm 40 or longer; skull longer than 20; canine breadth at cingula more than 5.5; third upper molar present 60

59(58) Braincase relatively shorter, more highly vaulted, more elevated above facial area as seen in lateral profile (fig. 166); top of rostrum flattened, bordered laterally by distinct angular ridge (A) below which is flattened wall of bone (B) that turns sharply outward at anterior edges; calcar shorter than 4.2 mm .... ***Artibeus anderseni***

Braincase relatively elongate, less vaulted, less elevated above facial area (fig. 167); top of rostrum less distinctly flattened, more gradually rounded laterally and with a pit rather than flattened area as described beneath this rounded edge in anterior part of orbit .... ***Artibeus glaucus***

60(58) Blackish, with four whitish facial stripes; forearm about 40 mm long; third upper and lower molars present; mastoid breadth less than 11.3 .... ***Artibeus hartii***

Brownish, without facial stripes; with paler leading edge and tips of wing; forearm about 50; usually no third lower molar; mastoid breadth more than 11.3 .... ****Artibeus* (*Koopmania*) *concolor***



[Sturnirinae begin here]

61(3) Forearm longer than 47 mm; metacarpal of third finger (measured from outer curve of wrist) longer than 44; condylobasal length greater than 21.5 . . . 64

Forearm shorter than 47; metacarpal of third finger shorter than 45; condylobasal length less than 21.8 62

62(61) Condylobasal length less than 19.4 mm . . . . ***Sturnira erythromos***

Condylobasal length more than 19.4 63

63(62) Occlusal view of first upper molar roughly square (fig. 168); posterior lingual corner angular; cusps on lingual sides of lower molars pointed and relatively tall (fig. 170); M2 much smaller than M1 . . . . ***Sturnira lilium***

M1 less squared (fig. 169); posterior lingual corner often rounded and with a gently sloping side; cusps more rounded and shorter, forming a shallow and broad occlusal surface (fig. 171); M2 only slightly smaller than M1 . . . . ***Sturnira oporaphilum***

64(61) Forearm longer than 55 mm; condylobasal length greater than 24 . . . . ***Sturnira magna***

Forearm shorter than 55; condylobasal length of skull less than 24 . . . . ***Sturnira tildae***

KEY 7

SPECIES OF THYROPTERIDAE IN BOLIVIA

1 Larger, length of forearm more than 38.7 mm; length of skull more than 15.6 . . . . ****Thyroptera lavali***

Smaller, forearm less than 38.7; skull less than 15.6 2

2(1) Venter white or partly white; dorsum darker; tail projecting 5 to 8 mm beyond uropatagium; usually two cartilaginous lobules on posterior edge of calcar . . . . ***Thyroptera tricolor***

Venter not white, only slightly paler than dorsum; dorsum usually not so dark; only last two vertebrae project about 2 mm beyond membrane; only one cartilaginous lobule on calcar . . ***Thyroptera discifera***

KEY 8

GENERA AND SPECIES OF VESPERTILIONIDAE IN BOLIVIA

1 Tail membrane at least partly covered with hair on dorsal surface (fig. 172) . . . . ***Lasiurus***, 2

Tail membrane nearly hairless 4

2(1) Hair on tail membrane confined to part near body; pelage yellowish; one upper premolar . . . . ***Lasiurus ega***

Hair extending on membrane to near edge; pelage reddish or frosted gray; two upper premolars 3

3(2) Forearm longer than 45 mm; grayish . . . . ***Lasiurus cinereus***

Forearm shorter than 45; reddish . . . . ***Lasiurus blossevillii***

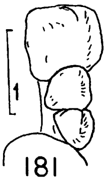
4(1) Ears much longer than head . . . . ***Histiotus***, 5

Ears about equal to or shorter than head 6

5(3) Inturning lobe at base of anterior margin of ear less developed (fig. 173); length of skull usually less than 18.4 mm . . . . ***Histiotus montanus***

Inturning lobe large and triangular, reaching well beyond tip of snout when ears are folded forward (fig. 174) . . . . ***Histiotus velatus***

6(4) Canine and last premolar of upper jaw separated by two small teeth (may need



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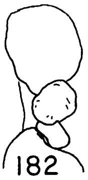

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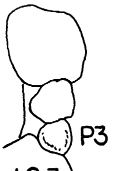

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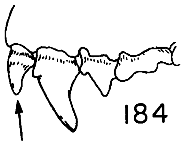

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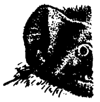

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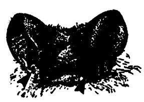

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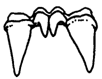

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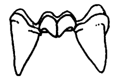

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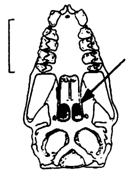

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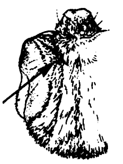

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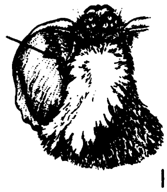

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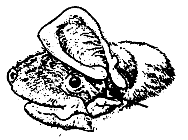

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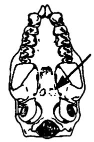

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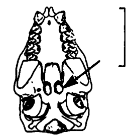

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magnification to see, fig. 175, shows *M. oxyota*) . . . . ***Myotis***, 7

Canine and last premolar of upper jaw in contact, not separated by intermediate teeth (fig. 176, shows *Eptesicus*) 13

7(6) Sagittal crest usually present (fig. 177), often well developed; canine breadth usually more than breadth at postorbital constriction or if about equal, then postorbital breadth usually more than 3.7 mm 8

Sagittal crest usually absent (fig. 178), if present poorly developed; canine breadth usually less than breadth at postorbital constriction, or if about equal, then postorbital breadth usually less than 3.7 10

8(7) Fur on upper surface of uropatagium extends at least halfway from knee to foot along tibia, sometimes reaching foot; P3 may be crowded but is in tooth row (fig. 181) . . . . ***Myotis keaysi***

Fur on uropatagium does not reach knee; P3 usually crowded to lingual side of tooth row (figs. 182 and 183) 9

9(8) Fur extremely short (2 mm on back), yellowish orange, and contrasting with blackish of membranes; breadth at postorbital constriction wide, about 3.8 mm; P3 scarcely visible in lateral view (fig. 182) . . . . ***Myotis simus***

Fur longer (3 mm on back); darker brownish or blackish, less contrasting with color of membranes; breadth at postorbital constriction narrow, about 3.5; P3 crowded lingually but clearly visible in lateral view (fig. 183) . . . . ***Myotis riparius***

10(7) Uropatagium fringed (may require magnification to observe) and often with pale border; forearm usually 37 to 40 mm long; greatest length of skull usually 14.5 to 16 . . . . ***Myotis levis***

Uropatagial fringe rarely present, no pale border; size in some cases smaller 1

11(10) May have slight fringe on uropatagium, visible with magnification; dorsal fur dark (often black) with tips of many hairs white or yellow, giving a frosted appearance . . . . ***Myotis albescens***

No fringe (except *M. oxyotus* may have sparse fringe); in dorsal fur, color of distal part not confined to the tip but extending one-third to one-half of hair length and either contrasting with more proximal part or contrasting very little with base, or both types of coloration in the same pelage 12

12(11) Fur long (5 to 6 mm), bicolored; forehead comparatively steeply sloping (fig. 179); size large, forearm about 40, skull more than 14.5 long . . ***Myotis oxyotus***

Fur variable, very weakly bicolored, often blackish; forehead variable (fig. 180); forearm usually shorter than 40; skull shorter than 14.5 . . ***Myotis nigricans***

13(7) Two pairs of upper incisors (fig. 176); larger, skull longer than 14.5 mm; forearm longer than 35 . . . . ***Eptesicus***, 14

One pair of upper incisors (fig. 184); smaller, skull shorter than 14.5; forearm shorter than 35 . . . ***Rhogeessa tumida***

14(13) Smaller, greatest length of skull less than 16.8 mm; forearm shorter than 42; color blackish . . . . ***Eptesicus furinalis***

Larger, greatest length of skull more than 16.8; forearm longer than 42; color brownish . . . . ***Eptesicus andinus***

KEY 9

GENERA AND SPECIES OF MOLOSSIDAE IN BOLIVIA

Bats of the family Molossidae are recognizable by the thick tail, about half of which extends beyond the edge of the well-developed uropatagium (except in flight when the membrane extends nearer the tip of the tail). They have narrow wings and fly rapidly. The foot is broad with sensory hairs extending beyond the claws. The ears are thick, their anterior margins close together—-in some species actually joined across the forehead. Flight membranes are all thick.

1 Antitragus distinctly constricted at its base (fig. 185) 2

Antitragus not distinctly constricted at its base (fig. 186) 5

2(1) Upper incisors caniniform, tips well separated (fig. 187); palate conspicuously domed; four lower incisors (lens needed); base of fifth metacarpal furry .... ***Promops***, 4

Upper incisors triangular, tips closely appressed and forming a beaklike structure (fig. 188); palate only slightly domed; two lower incisors; base of fifth metacarpal less hairy ... ***Molossus***, 3

3(2) Larger, forearm longer than 45 mm; skull longer than 19 ..... ***Molossus rufus***

Smaller, forearm shorter than 45; skull shorter than 19 .. ***Molossus molossus***

4(2) Larger, forearm longer than 51 mm; skull longer than 19 ... ***Promops centralis***

Smaller, forearm shorter than 51; skull shorter than 19 .... ***Promops nasutus***

5(1) Deep vertical grooves in upper lips (fig. 186) 6

No conspicuous vertical grooves in upper lips 9

6(5) Larger, forearm 48 mm or longer; skull longer than 18 8

Smaller, forearm 48 or shorter; skull shorter than 18 7

7(6) Ears joined at midline of head, reaching beyond nose; antitragus higher than width at base; pelage reddish brown .. .. ***Nyctinomops laticaudatus***

Ears not joined at midline, not reaching beyond nose; antitragus wider at base than high; pelage darker and less reddish brown .... ***Tadarida brasiliensis***

8(6) Larger, forearm longer than 50 mm; skull longer than 20.5; ears longer than 18 mm; color grayish brown .... ***Nyctinomops macrotis***

Smaller, forearm shorter than 50; skull usually shorter than 20.5; ears shorter than 18; color brown to blackish .... ***Nyctinomops aurispinosus***

9(5) Ears joined in midline .... ***Eumops***, 10

Ears clearly separate ... ***Molossops***, 14

10(9) Smaller, forearm less than 55 mm (usually 37 to 49); skull shorter than 22 .... ***Eumops bonariensis*** or ***E. hansae***

Larger, forearm longer than 55; skull longer than 22 11

11(10) Ears long (35 to 44 mm) ; tragus large, broad and square; basisphenoid pits deep and elongate (fig. 189); mastoid breadth less than 52% of condyloincisive length .... ***Eumops perotis***

Ears short (17 to 34); tragus small, pointed or square; basisphenoid pits not so deep (fig. 193); mastoid breadth more than 52% of condyloincisive length 12

12(11) Larger, skull longer than 28 mm (males) or 27 (females); ear heavily keeled (fig. 190, arrow); dorsal pelage cinnamon with buff basal band .... ****Eumops dabbenei***

Smaller, skull shorter than 28 (males) or 27 (females); ear not heavily keeled (fig. 191); pelage snuff brown to sepia (with white basal band) or blackish brown 13

13(12) Tragus small and pointed (fig. 192); dorsal pelage blackish brown; basisphenoid pits shallow (fig. 193, arrow); mastoid breadth less than 49% of skull length .... ***Eumops auripendulus***

Tragus broad and square; dorsal pelage snuff brown to bister with white basal band; basisphenoid pits well defined (fig. 194 arrow); mastoid breadth more than 52% of skull length .... ***Eumops glaucinus***

14(9) Forearm length about 45 mm; total length 90–100; dorsum cinnamon red .... ***Molossops abrasus***

Forearm shorter than 40 15

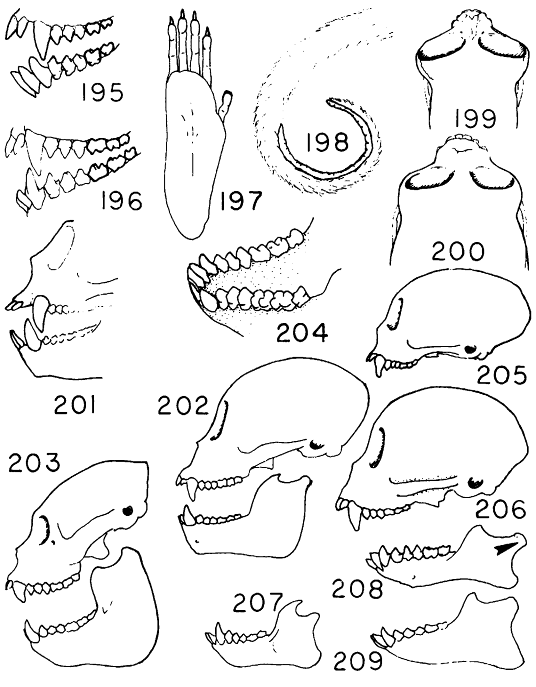
15(14) Forearm longer than 31 mm; skull longer than 16; extensive areas of white on venter; four lower incisors; large square antitragus ... ***Molossops planirostris***

Forearm shorter than 33; skull shorter than 16; throat pale; two lower incisors; small narrow antitragus .... ***Molossops temminckii***

KEY 10

GENERA AND SPECIES OF CALLITRICHIDAE AND CEBIDAE IN BOLIVIA

1 Two molars above and below on each side (fig. 195 shows *Callithrix*); generally small, head and body shorter than 250 mm) ..... **Family Callitrichidae, 15**



Three molars above and below on each side (fig. 196 shows *Callimico*) 2

2(1) Flattened unguis or nail on most or all digits; size medium to large (head and body length rarely less than 300 mm); various colors, most species not black . . . . **Family Cebidae**, 3

Nail only on hallux, other digits bearing claws (fig. 197); size small (head and body length less than 250); pelage mostly blackish . . . . **Subfamily Callimiconinae, *Callimico goeldii***

3(2) Tail not fully prehensile, hairy throughout its length; head plus body length generally between 300 and 500 mm; total length usually less than 1 m 4

Tail fully prehensile, with naked skin on ventral surface near tip (fig. 198); head plus body length generally more than 500 mm; total length of adults rarely less than 1 m 11

4(3) Orbits large (fig. 199) . . . . **Subfamily Aotinae, *Aotus***, 5

Orbits of normal size (fig. 200) 6

5(4) Occurring north of the río Madre de Dios; with 51 or 52 chromosomes in the diploid set; not easily distinguished by external features or skull . . . . ***Aotus nigriceps***

Occurring south of the río Madre de Dios; 2*n* = 49 or 50 chromosomes . . . . ***Aotus azarai***

6(4) Incisors not long and protrusive, not widely separated from canines 7

Incisors long and protrusive (fig. 201), close together and widely separated from canines . . . . **Subfamily Pitheciinae**, 10

7(6) Lower canines long, projecting distinctly above tooth row (figs. 202, 203); with considerable sexual dimorphism . . . 8

Lower canines short, barely projecting above other teeth (fig. 204); no obvious sexual dimorphism . . . . **Subfamily Callicebinae, *Callicebus***, 4 species, see text

8(7) Skull elongate and with large occipital region (fig. 205); oval interorbital opening; tail length about 1.3 times head plus body length; not at all prehensile . . . . ***Saimiri sciureus***

Skull not especially elongate, braincase normally rounded (fig. 206); interorbital septum complete; tail length about the same as head plus body, semiprehensile . . . . ***Cebus***, 9

9(8) Head tufted with dark brown or black erect hairs on crown forming lateral ridges or a complete cap; dark bands down sides of face, meeting beneath chin; limbs generally darker than body . . . . ***Cebus apella***

Head not tufted, smooth brown hairs form broad patch set well back on crown; face, forehead, throat, shoulders, upper arms, and chest are whitish; hands and feet usually paler than body . . . . ***Cebus albifrons***

10(6) Pelage relatively short and soft; hairs radiate from whorl on the top of head, directed sideways to form bushy lateral tufts; beard long and thick . . . . ****Chiropotes albinasus***

Pelage long and shaggy, forms hood and cape . . . . ***Pithecia irrorata***

11(3) Braincase large and rounded (fig. 202); foramen magnum directed downward; hyoid not especially enlarged; lower jaw not unusually deep (fig. 202); black with no distinctive markings of another color . . . . **Subfamily Atelinae**, 14

Braincase small and flattened (fig. 203); foramen magnum directed backward; hyoid enlarged, lower jaw unusually deep (fig. 203) . . . . ***Alouatta***, 12

12(11) Pelage maroon or copper red . . . . ***Alouatta seniculus***

Not as above 13

13(12) Dark brown; hairs tipped with light brown .... ***Alouatta guariba***

Black (adult males) or olive-buff or yellowish (females and young) .... ***Alouatta caraya***

14(11) Long shaggy hair, directed forward above the eyes to form peak . . ***Ateles chamek***

Dense, short, plushy hair; head rounded .... ****Lagothrix lagotricha***

15(1) Lower jaw U-shaped; lower canines are much longer than incisors (fig. 207, hence "long-tusked") . . ***Saguinus***, 16

Lower jaw narrow and V-shaped; lower incisors and canines form a prominent semicircular row of six teeth with the canines scarcely higher than incisors (fig. 195, "short-tusked") 19

16(15) Facial skin white beneath long white mustache, otherwise black .... ***mystax* group,** 17

Facial skin and hair black except for short white hairs of mustache; mottled black and buff saddle separates fore and hind parts (trizonal pattern) .... ***Saguinus fuscicollis***

17(16) Grayish buff, speckled; mustache long (60 mm); tail generally reddish with dark gray tip .... ***Saguinus imperator***

Blackish in large part; mustache outlines lips or is larger but not exceptionally long; tail mostly black 18

18(17) Tail entirely black . . ****Saguinus mystax***

Tail reddish or orange on ventral side near base; underparts of body also reddish or orange; white patch on crown .... ***Saguinus labiatus***

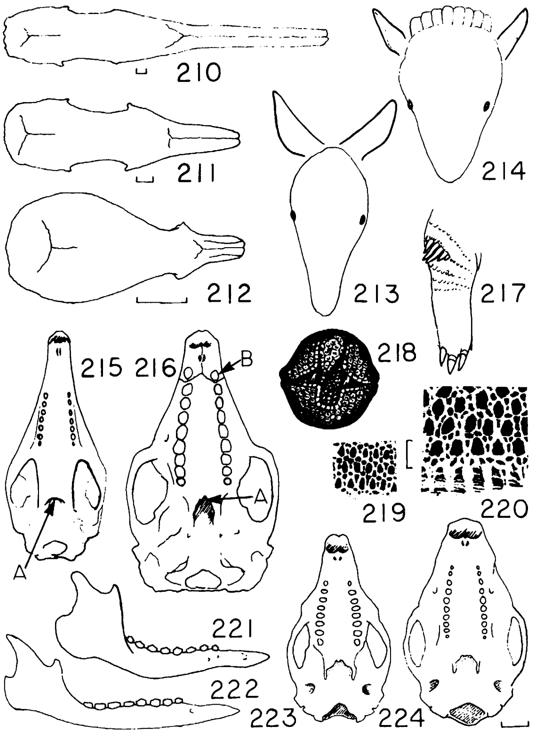
19(15) Head plus body length less than 175 mm; condylar process of jaw extends posteriorly (fig. 208); neutral gray-brown owing to black and buff banding of hairs; tail banded dorsally, less than 250 long .... ***Cebuella pygmaea***

Head plus body length more than 175 ; condylar process of jaw less extended (fig. 209); pelage brown with white hip-patches; tail black and not ringed, tail longer than 250 .... ***Callithrix melanura***

KEY 11

GENERA AND SPECIES OF MYRMECOPHAGIDAE IN BOLIVIA

The anteaters or Myrmecophagidae are toothless, have relatively pointed snouts, small mouths, and long tongues. The forelimbs are strong and there is no zygomatic arch.



1 Hair coarse and long; tail bushy, not prehensile; size large, head plus body longer than 700 mm; skull longer than 200 and rostrum proportionally long (fig. 210) ... . ***Myrmecophaga tridactyla***

Hair not coarse or long; tail not bushy, partly naked at tip, prehensile; head plus body length less than 700; skull shorter than 200, rostrum proportionally not so long (figs. 211, 212) 2

2(1) Four claws on forefoot; fur, relative to the size of the animal, short and smooth; length of head plus body more than 300 mm; rostrum and nasals not extremely short (fig. 211); length of skull more than 70 .... ***Tamandua tetradactyla***

Two claws on forefoot; fur dense, soft, and silky; length of head and body less than 300; rostrum and nasals extremely short when compared to braincase (fig. 212); length of skull less than 70 .... ***Cyclopes didactylus***

KEY 12

GENERA AND SPECIES OF DASYPODIDAE IN BOLIVIA

The armadillos or Dasypodidae are readily distinguished by their external "armor," their simplified, peglike, persistently growing teeth without enamel coverings, and their short, stout limbs with strong, curved claws.

1 Snout long and slender; ears close together on top of head (fig. 213); longest claw on forefoot about half of length of ear; palate very long (fig. 215A), length behind tooth rows more than half of the length of the tooth rows .... **Subfamily Dasypodinae, *Dasypus*,** 2

Snout heavier; ears set wide apart on sides of head (fig. 214); longest claw of forefoot noticeably longer than half the length of ear (in some cases longer than ear); palate shorter (fig. 216A), length behind tooth rows less than half length of tooth rows 5

2(1) Conspicuous long, thick, brown hair; scutes of carapace not visible without parting hair .... ***Dasypus pilosus***

Very few hairs; scutes of carapace clearly visible 3

3(2) Nasal bones longer than 35 mm; strikingly enlarged scutes on patellar region (fig. 217); usually five toes on forefeet .... ***Dasypus kappleri***

Nasal bones shorter than 35; scales of patellar region not much larger than other scales on hind leg; usually with four claws on forefeet 4

4(3) Larger, total length more than 700 mm; length of skull more than 88; length of head shield more than 80; usually eight or more movable bands on the back; larger scutes on anterior and dorsal shields of carapace about 3–4 mm from center to center, smaller, and more closely spaced (fig. 219) .... ***Dasypus novemcinctus***

Smaller, total length less than 700; length of skull less than 88; length of head shield less than 80; usually fewer than eight movable bands on back; largest scutes about 5–6 from center to center, larger, and more widely separated (fig. 220) .... ***Dasypus septemcinctus***

5(1) Hairy, a noticeable quantity of long hairs on banded area of back, many extending beyond adjacent band; most anterior upper tooth is in premaxillary bone (fig. 216B); head wide, width of skull more than half its length (fig. 216) .... **Subfamily Euphractinae,** 6

Few dorsal hairs on banded area of back and these not extending beyond adjacent band; most anterior upper tooth is in maxillary bone; width of skull less than half its length 9

6(5) Many scutes of head shield exceed 10 mm in greatest diameter; scales of nape band anteroposteriorly longer than wide (fig. 214) ... ***Euphractus sexcinctus***

Few scutes of head shield exceed 10; scales on nape band somewhat variable but often transversely wider than long .... ***Chaetophractus***, 7

7(6) Smaller, head and body length less than 250 mm, condylonasal length less than 80; ear proportionally long, extending to first immobile row of scutes in scapular shield; width of cranial shield less than 90% of its length; dorsum variegated brown and pale tan .... ***Chaetophractus vellerosus***

Larger, head plus body length more than 250 in large adults, condylonasal length more than 80; ear long or shorter; head shield ratio more than 90% of its length 8

8(7) Dorsum tan, covered with long, brown and pale tan hairs; ear long, approximately 30 mm; restricted to high Andean grasslands .... ***Chaetophractus nationi***

Dorsum dark brown with sparse, long, black and brown hairs; ear shorter ... . ***Chaetophractus villosus***

9(5) Small, head plus body length less than 200 mm; distinct rump plate, nearly vertical, not blending imperceptably with the dorsal scaled area .... **Subfamily Chlamyphorinae, *Chlamyphorus retusus***

Head and body longer than 200; no distinctly separate vertical rump plate ..10

10(9) Nasals shorter than 20 mm; tail shorter than head; two to four, usually three, movable bands in carapace, bands clearly distinct from continuous shields of front and rear parts of carapace (fig. 9); able to roll into compact ball (fig. 218); longest claw on forefoot shorter than 30 mm .... **Tribe Tolypeutini, *Tolypeutes matacus***

Nasals longer than 20; tail longer than head; many more than three movable bands and these seem to grade into the immovable areas at front and rear; longest claw longer than 30 .... **Tribe Priodontini,** 11

11(10) Tail with scattered scales separated by areas of skin often as wide as the scales themselves; skull shorter than 110 mm; head plus body length less than 400;

teeth not so flattened laterally as to be sometimes twice as long as wide .... ***Cabassous***, 12

Tail not with most scales separated by areas of skin; gigantic, skull longer than 110 (up to at least 180); head plus body length longer than 400; some teeth so flattened as to be twice as long anteroposteriorly as wide ....***Priodontes maximus giganteus***

12(11) Smaller, interorbital breadth less than 23 mm; ear shorter than 20 and with fleshy anterior edge; mandible distinctly curved (fig. 221); transverse diameters of all but first and last teeth greater than anteroposterior diameters; skull relatively more slender (fig. 223) .... ****Cabassous chacoensis***

Larger, interorbital breadth more than 23.5 mm; ear longer than 25 and without thickened anterior edge; mandible not distinctly curved (fig. 222); skull relatively broader (fig. 224); transverse diameters of teeth usually less than anteroposterior diameters .... ***Cabassous unicinctus***

KEY 13

GENERA AND SPECIES OF CANIDAE IN BOLIVIA

1(2) Skull usually with bulging forehead as seen in profile (fig. 225; size, bodily proportions, color, length of hair, and other features highly variable, depending on breed); domestic ...... ***Canis familiaris***

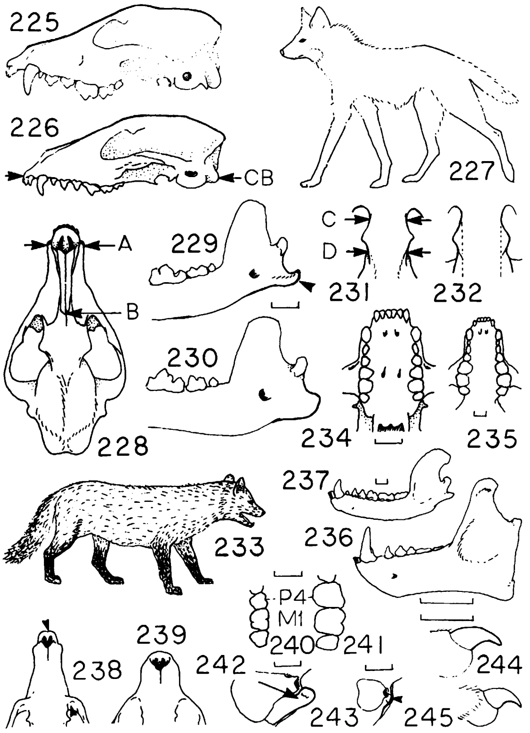
Skull with straighter profile, less bulging forehead (fig. 226; size, proportions, color, length of hair, and other features vary with species, but not much within species); wild 2

2(1) Either the size of a large dog and unusually long-legged (fig. 227) or the size of a small dog and unusually short-legged (fig. 41); length of skull greater than 195 mm or less than 130 3

Both size and proportions moderate (as in a dog of medium size); breadth across upper canines at alveolus (fig. 228A) between 25 and 35; length of skull between 195 and 130 4

3(2) Large, long-legged (fig. 227), height at shoulder about 850 mm; ears longer than 60 from notch; white patch on throat and black stripe below white (general color reddish brown); tail longer than head; longest hairs longer than 70; noticeable mane of longer hair on neck; breadth across upper canines more than 35 .... ***Chrysocyon brachyurus***

Small, short-legged (fig. 41), height at shoulder less than 350; ears small, shorter than 60 from notch; no white and black patches on throat, head and neck paler than more posterior and ventral areas (general color reddish brown); tail short, about the length of head; hair short and coarse, no fine underfur, longest hairs about 30; no mane; breadth across canines less than 35 .... ***Speothos venaticus***



4(2) Distinct rusty patches on sides of front and hind limbs and on and behind ears; larger, upper canine breadth more than 27 mm; length of skull more than 165; fourth upper premolar longer than 16.8; lives at high elevations .... ***Pseudalopex culpaeus***

If pelage has a generally reddish hue, the rusty patches noted are absent or indistinct and reddish color extends along belly as well as on legs; smaller, upper canine breadth less than 27; skull shorter than 165; P4 shorter than 16.8; usually found at lower elevations 5

5(4) Angular process narrow (fig. 229); breadth at postorbital constriction about the same as (fig. 231D), or noticeably less than (fig.

228), breadth at interorbital constriction (fig. 231C) 6

Angular process broad (fig. 230); breadth at postorbital constriction greater than at interorbital constriction (fig. 232) .... *Cerdocyon thous*

6(5) Pelage paler, almost white below; legs bicolor (whitish on one side), not black; ears longer than 50 mm from notch; smaller, condylobasal length about 135; interorbital (fig. 231C) and postorbital constrictions (fig. 231D) about equal; nasals extending about same distance posteriorly as maxillaries .... *Pseudalopex gymnocercus*

Pelage dark, not whitish below; legs almost pure black; ears shorter than 50 (fig. 233); larger, condylobasal length (fig. 226) about 160; breadth at postorbital constriction noticeably less than at interorbital constriction (fig. 228); nasals usually do not extend so far posteriorly as maxillaries (fig. 228B) .... *Atelocynus microtis*

KEY 14

GENERA AND SPECIES OF PROCYONIDAE IN BOLIVIA

1 No dark rings on tail; three premolars above and below; palate parallel-sided, upper canines nearly as far apart as molars (fig. 234); mandible unusually deep (fig. 236), entire lower tooth row shorter than greatest depth of jaw .... *Potos flavus*

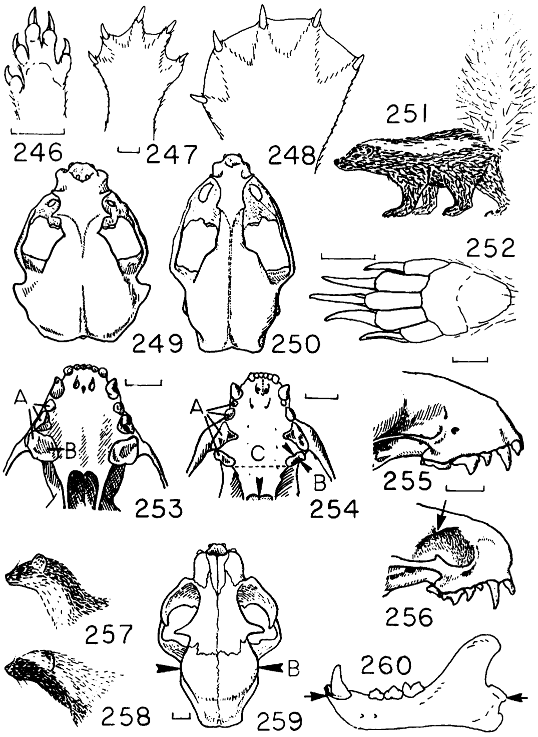
Tail with or without rings; four premolars above and below; palate narrowing anteriorly (fig. 235); jaw slender, tooth row much longer than depth of jaw (fig. 237) 2

2(1) Rostrum elongated and compressed laterally, distance from front of eye to front of teeth more than 50 mm (fig. 238); upper fourth premolar (P4) and first upper molar (M1) usually longer anteroposteriorly than broad (fig. 240) .... *Nasua nasua*

Rostrum not elongated and not laterally compressed; distance from front of eye to front of teeth less than 50 (fig. 239); P4 and M1 as broad mediolaterally as anteroposteriorly or broader (fig. 241) 3

3(2) Eyes surrounded by black pelage that forms a "mask" across the face; tail with rings of black, shorter than length of head plus body; large, breadth across upper canines (fig. 44C) more than 25 mm; mastoid large (fig. 242); claws relatively blunt, not much curved (fig. 244); all digits extend more than 15 beyond their basal connections .... *Procyon cancrivorus*

No distinct black markings, pelage nearly uniform dorsally; tail not conspicuously ringed but may show faint alternating dark and paler areas; tail longer than length of head plus body; smaller, breadth across upper canines less than 25; mastoid small (fig. 243); claws relatively sharp and curved (fig. 245); web of skin between short toes reaching nearly to base of distal pad (fig. 246) ...... *Bassaricyon alleni*



KEY 15

GENERA AND SPECIES OF MUSTELIDAE IN BOLIVIA

1 Dorsal pelage brown, relatively short and sleek and with no distinctly contrasting marks on back or head (although throat may have whitish patch); head same color as back; five upper teeth behind canines .... **Subfamily Lutrinae, 2**

Dorsal pelage not as above; three or four upper teeth behind canines 3

2(1) Tail without a prominent keel on each side; basal part of toes webbed, usually to base of distal phalanx (fig. 247 shows right front foot); condylobasal length less than 130 mm; frontal area short; skull relatively broad posteriorly (fig. 249) .... *Lutra longicaudis*

Tail somewhat flattened, with prominent keel on each side; toes webbed more extensively, always to the nails (fig. 248); condylobasal length of skull more than 120; frontal area long; skull relatively narrow posteriorly (fig. 250) .... *Pteronura brasiliensis*

3(1) Pelage of contrasting white markings on black background (fig. 251); claws of forefoot long and strong (fig. 252), the longest more than 14 mm; only three upper teeth behind canine (fig. 253A), the back tooth (= M1) large, its length about the same as its width (fig. 253B); no postorbital processes (fig. 255); little extension of bony palate behind level of teeth, extension less than distance between teeth (fig. 253) ..... **Subfamily Mephitinae,** *Conepatus chinga*

Pelage not of contrasting white on black; front claws shorter than 14; four upper teeth behind canines, the back tooth about twice as wide mediolaterally as from front to back and with a medial constriction (fig. 254B); postorbital processes present (fig. 256); bony palate extending well behind teeth, usually more than the distance between teeth (fig. 254C) .... **Subfamily Mustelinae,** 4

4(3) Tail longer than 300 mm and longer than half the length of the head plus body (fig. 42); breadth across upper canines greater than 25; condylobasal length of skull (fig. 46A) more than 100; head usually paler than blackish back but some individuals pale golden over most of body, head without striking markings of blackish and whitish or cream color ... *Eira barbara*

Tail shorter than 300 and in some cases shorter than half the length of head plus body; condylobasal length less than 100; head not noticeably paler than back, head with striking markings of blackish and whitish or cream color 5

5(4) Condylobasal length less than 50 mm; total length less than 400; blackish part of head is top part, venter is whitish or yellowish (fig. 257) .... *Mustela frenata*

Condylobasal length more than 50; total length more than 400; blackish part of head is bottom part, extending up over nose and backward onto venter, top of head is grizzled plus between these areas is a paler cream-colored stripe (fig. 258) .... *Galictis,* 6

6(5) Larger, head plus body length more than 450 mm; condylobasal length of skull more than 75, breadth across upper canines more than 17; weight usually greater than 1.2 kg .... *Galictis vittata*

Smaller, head plus body length less than 450; condylobasal length less than 75; upper canine breadth less than 17; weight about 1 kg .... *Galictis cuja*

KEY 16

GENERA AND SPECIES OF FELIDAE IN BOLIVIA

1 Braincase smaller, its greatest width (fig. 259B) usually less than 43.5 mm; color pattern varies greatly among individuals but never consists of black spots on yellowish or orange background; domestic species .... *Felis catus*

Braincase larger, its width usually more than 43.5 (if less than 43.5, then has black spots on orange background); color varies among species; wild species 2

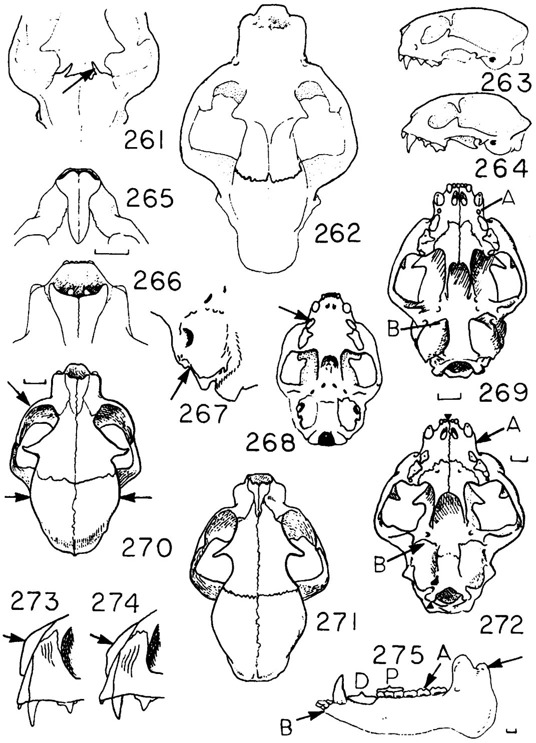
2(1) Size large, head plus body longer than 1100 mm; hind foot longer than 165; condylobasal length (measurement shown in fig. 46A) more than 115; length of mandible (fig. 260) more than 80 3

Size medium, head plus body shorter than 1100; hind foot shorter than 165; condylobasal length less than 115; length of mandible less than 80 4

3(2) Whiskers growing from solid black patch, solid white patch between black patch and nose; dorsal pelage of adults a relatively uniform brownish above (young have spots); breadth across upper canines usually less than 55 mm; anterior flange on parietal often overlaps frontal (fig. 261), but flange sometimes absent or bones fused and flange not evident .... *Felis concolor*

Not so marked; pelage a striking pattern of black spots on orange background (except in occasional melanistic individuals in which the spots are almost obscured); breadth across upper canines usually more than 55; suture between parietal and frontal without flange noted (fig. 262) .... *Panthera onca*

4(2) Dorsal profile of skull only slightly arched (fig. 263), nasals extending relatively far forward (fig. 265); dorsal pelage a relatively uniform reddish, brownish, or grayish, with no conspicuously contrasting markings; at least part of the dorsal surface with "salt and pepper" effect .... *Felis yaguarondi*



Dorsal profile highly arched (fig. 264); nasals terminating well back of premaxillary exposing anterior edges of incisive alveoli in dorsal view (fig. 266); dorsal pelage less uniform in color, usually with contrasting dark markings (spots, stripes, blotches) on paler background (in occasional melanistic individuals, markings are faintly visible under close examination even if general appearance is of solid black, without "salt and pepper" effect) 5

5(4) Cranium long and narrow; notch or groove at junction of anterior and posterior chambers of bulla (fig. 267); anterior premolar toes in at front (fig. 268); pelage thick; color ashen, with widely spaced coffee-colored or darker spots . . ***Felis jacobita***

Cranium relatively broader; less distinct notch or groove (fig. 269); anterior premolar more in line with posterior premolar; pelage not so thick, color variable, usually not resembling above description 6

6(5) Eyes relatively large (fig. 270), with maxillary rim of orbit more delicate and flared outward, or, if eyes do not seem relatively large, then size small, condylobasal length of skull less than 85 mm; length of head plus body less than 550; the largest upper molariform tooth (P4) shorter than 11 mm7

Eyes relatively smaller (fig. 271), maxillary rim seems more robust and less flared outward; P4 longer than 11 8

7(6) Hair on dorsum of neck pointing backward; smaller, length of P4 less than 11 mm, breadth across upper canines less than 21; braincase oval . . . . ****Felis tigrina***

Hair on dorsum of neck pointing forward; larger, length of P4 more than 11, breadth across upper canines more than 21; braincase more rounded (fig. 270) . . . . ***Felis wiedii***

8(6) Larger, breadth across upper canines more than 29 mm; skull longer than 105; P4 longer than 12.7; some markings have a dark border and paler center (on even paler background color) . . . . ***Felis pardalis***

Smaller, breadth across upper canines less than 29; skull shorter than 105; P4 shorter than 12.7; few if any two-toned patches with dark borders 9

9(8) Small anterior maxillary tooth (P2) usually (80% of cases) absent (fig. 272A); tympanic bulla rounded anteriorly (fig. 272B); profile of nasal bones turns downward near its middle (fig. 273); markings on lower legs heavier than on more dorsal parts of body; fewer spots; middorsal crest of long hairs from behind shoulders to base of tail . . . . ***Felis pajeros***

Small tooth (P2, P1 not present) always present (fig. 269A); bullae more extended and constricted anteriorly (fig. 269B); nasal bones straighter in profile (fig. 274); markings on lower legs not heavier than on more dorsal areas; more spots; no middorsal crest of long hairs . . . . ***Felis geoffroyi***

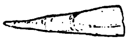
KEY 17

GENERA AND SPECIES OF TAYASSUIDAE OF BOLIVIA

1 The lower second molar (m2, the second tooth on the mandible counting from the back; fig. 275A) longer than 17 mm; total length of mandible (from condyle to anterior tip; fig. 275B) greater than 200; ratio of depth of bone below m2 to the total length of mandible less than 1 to 6 . . . . ***Catagonus wagneri***

The lower second molar (m2) shorter than 17; total length of mandible less than 200; ratio of depth of bone below m2 to length of mandible more than 1 to 6 . . . . ***Tayassu***, 2

2(1) Alveolar length of lower cheekteeth more than 75 mm; mandible longer than 165;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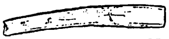
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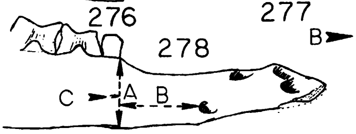
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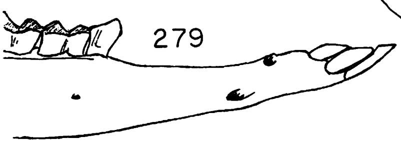
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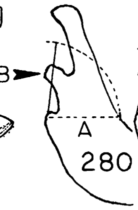
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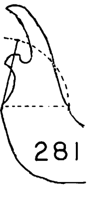
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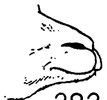
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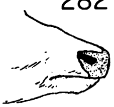
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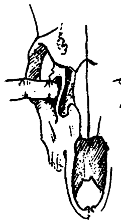
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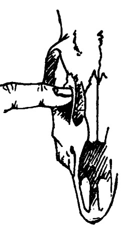
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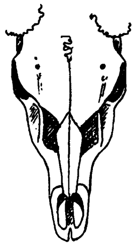
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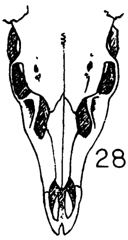
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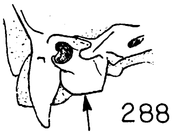
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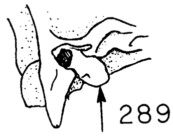
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diastema (fig. 275D) in lower tooth row greater than 29; alveolar length of lower three premolars (fig. 275P) greater than 29; D greater than P; D times P greater than 860 .... *Tayassu pecari*

Alveolar length of lower cheekteeth less than 75; mandible shorter than 165; D less than 29; P less than 29; D less than P; D times P less than 860 ... *Tayassu tajacu*

KEY 18

GENERA AND SPECIES OF CAMELIDAE IN BOLIVIA

This key is adapted from that of Cabrera (1931). The variation in the four species of the genus *Lama* is sufficient to make identification uncertain in some cases even when the entire skull and jaw are present. There is, in fact, a difference of opinion as to whether they should be treated as distinct species. With broken or fragmented bones such as are found in archaeological sites, the problem is greater.

1 Lower incisors tapered to the ends of their roots, greatest width about one-fifth to one-fourth the length of tooth (fig. 276) except in some alpacas with unusually long incisors; size larger, greatest width of skull of adult more than 125 mm; color varies from black to white, usually not colored as is vicuña 2

Lower incisors of adults elongate and nearly parallel-sided (fig. 277), width about one-tenth length, and persistently growing (except in extremely old individuals or young ones in which milk teeth taper slightly, have widths about one-sixth of lengths, and have open roots); size small, greatest width of skull of adult less than 125; build delicate; dorsal pelage pale reddish brown, conspicuously whitish area on the body near base of neck ...... ***Lama vicugna***

2(1) Rostrum and lower jaw short; height of mandible at the front of fourth premolar (fig. 278A) almost equal to the distance from this point to the large mental opening (fig. 278B); submental opening (fig. 278C), usually beneath p4; domestic .... ***Lama pacos*, Alpaca**

Rostrum and jaw more elongate; height of mandible in front of p4 notably less than the distance from this point to the large mental opening (fig. 279); submental opening usually beneath front of m1 3

3(2) Ascending ramus of mandible broad, its anteroposterior span at level of angular process (fig. 280A) much more than the distance from this process to the condyle (fig. 280B); domestic .. ***Lama glama*, Llama**

Ascending ramus of mandible narrow, its width at the level of the angular process about equal to or not much more than the distance from this process to the condyle (fig. 281); nearly extinct in Bolivia .... ***Lama guanicoe*, Guanaco**

KEY 19

GENERA AND SPECIES OF CERVIDAE IN BOLIVIA

The Bolivian Cervidae are ruminant artiodactyls with no upper incisors; upper canines, if present at all, are small; without a flattened (piglike, fig. 15) muzzle or nearly horizontal slitlike nostrils (as in llamas, fig. 282), but with a distinct bare nosepad (fig. 283); and with branching antlers or spikes almost always present in males.

1 Preorbital pits in skull very deep (up to the length of one's fingernail in most cases, fig. 284), upper rim prominent 2

Preorbital pits not especially deep (fig. 285), rounded upper border 3

2(1) Antlers (when present) never with more than two tines; orbital rim relatively heavy, expanded dorsally and laterally so that greatest width of skull is at rim instead of at zygomatic arch, orbit facing only slightly dorsally (fig. 286); lower incisors fan out laterally so that width across incisors is almost as great as length of mandibular symphysis; pelage coarse and brittle, paler, flecked with black, legs paler; elevation 3000 to 4000 m .... ***Hippocamelus antisensis***

Antlers (when present) usually with more than two tines; orbital rim not so heavy, less expanded, greatest width of skull at zygomatic arch, orbit facing noticeably more upward and forward (fig. 287); breadth across incisors only about 60% of the length of symphysis; pelage less coarse, darker, rufous brown (redder in summer), legs dark; inhabits elevations below 1000 m .... ***Odocoileus dichotomus***

3(1) Auditory bulla moderately inflated (fig. 288); antlers (when present) usually with more than two points .... ***Odocoileus virginianus***

Auditory bulla slightly inflated (fig. 289); antlers (when present) with one or more points 4

4(3) Orbits relatively smaller, dorsoventral diameter of orbit (at widest point of orbit) is less than half the breadth between orbits (dorsal point of diameter dimension of each orbit as end point); antlers (when present) often with more than one point .... ***Odocoileus bezoarticus***

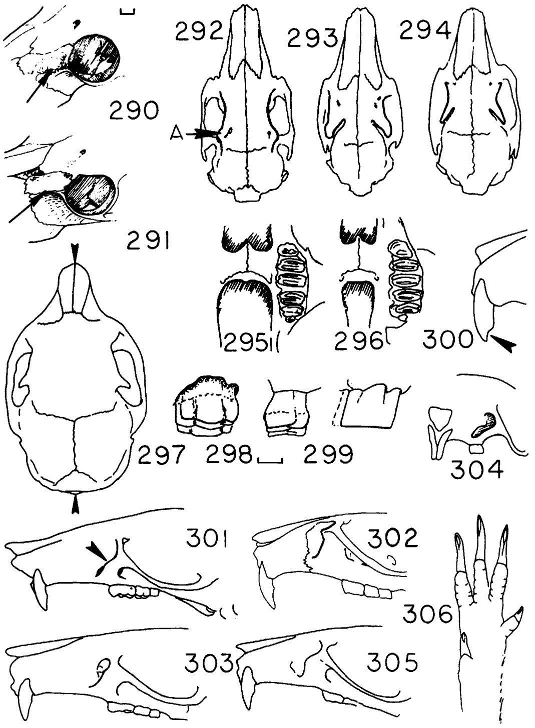
Orbits relatively larger, dorsoventral diameter more than half distance between orbital rims; antlers never more than a simple spike .... ***Mazama*****, 5**

5(4) Size small (head plus body shorter than 740 mm; skull shorter than 150; hind foot shorter than 175; length of dentary from articular process to anterior-most point less than 120 mm .... ***Mazama bricenii***

Size larger (head plus body longer than 740; skull longer than 150; hind foot longer than 175; length of dentary more than 120) 6

6(5) Skull longer than 190 mm; greatest breadth of skull at orbit more than 85; length of dentary generally 150–160; pelage reddish brown .... ***Mazama americana***

Skull shorter than 190; greatest breadth of skull at orbit less than 85; length of dentary about 140; pelage not reddish brown



but grayish brown .... ***Mazama gouazoupira***

KEY 20

GENERA AND SPECIES OF BOVIDAE IN BOLIVIA

The Bovidae of Bolivia are all introduced domestic animals. There are no native bovids in South America. Domestic herds and free-ranging individuals are common and important in the ecosystem. Skulls and other bones are often found. The inclusion of domestic as well as native species in these keys will help users to distinguish remains of native species from those of domestic ones.

1 Total length of skull (not including the horns if present) more than 350 mm .... ***Bos taurus***

Total length of skull (without horns) less than 350 2

2(1) Deep preorbital fossa; lacrimal-jugal suture passing across bottom of fossa (fig. 290) .... ***Ovis aries***

No evident preorbital fossa; lacrimal-jugal suture passing along crest of preorbital ridge (fig. 291) .... ***Capra hircus***

KEY 21

GENERA AND SPECIES OF LEPORIDAE IN BOLIVIA

1 Small, head plus body length usually less than 380 mm; hind foot shorter than 85 mm; tail small and inconspicuous, shorter than 30 mm, dark, not in part white; supraorbital process posteriorly not well separated from frontal (fig. 292A) .... native species, ***Sylvilagus brasiliensis***

Larger, head plus body usually longer than 380; hind foot longer than 85; tail conspicuous although relatively short in comparison to body, longer than 30, dark above and usually white below; supraorbital process well separated from frontal posteriorly (figs. 293 and 294) 2

2(1) Ear longer, length more than 100 mm from basal notch, with black patch on outer surface at tip; hind foot longer than 100 mm; head plus body longer than 550; supraorbital processes wide and more laterally projecting (fig. 293); mesopterygoid fossa wide (fig. 295); rostrum larger in proportion to rest of skull (fig. 293); introduced from Europe into Argentina, then spread into southern Bolivia .... ***Lepus europaeus***

Ears shorter, length less than 100 from notch, without large black patches although edges of ears sometimes black; hind foot shorter than 100; head plus body shorter than 550 (except in some large domestic breeds); supraorbital processes narrower and less laterally projecting (fig. 294); mesopterygoid fossa not so wide (fig. 296); rostrum smaller in proportion to rest of skull (fig. 294); domestic, native to Europe, no feral population known in Bolivia .... ****Oryctolagus cuniculus***

KEY 22

GENERA AND SPECIES OF SCIURIDAE IN BOLIVIA

Pelage reddish; large, length of head plus body usually more than 210 mm; occipitonasal length more than 50; hind foot (from back of heel to end of claws) longer than 50 .... ***Sciurus spadiceus***

Brownish; smaller, length of head plus body usually less than 210; occipitonasal length (fig. 297) less than 50; hind foot shorter than 50 .. .. ***Sciurus ignitus***

KEY 23

GENERA AND SPECIES OF MURIDAE IN BOLIVIA

1 Cusps of upper molar teeth arranged in three longitudinal rows (fig. 298); tail always conspicuously scaly and never well clothed in either long or short hairs; introduced species, usually commensal ..... **Subfamily Murinae**, 2

Cusps of upper molar teeth not arranged in three rows, may be in two rows or flattened occlusally so that no tops of cusps remain (fig. 299); tail may or may not show scales conspicuously, in most species tail more or less clothed in hair; native species, some inhabiting houses and other buildings in the absence of Murinae .... **Subfamily Sigmodontinae,** 3

2(1) Larger, hind foot longer than 28 mm; skull longer than 20; length of molar row more than 5 .... ***Rattus rattus***

Smaller, hind foot shorter than 23; skull shorter than 20, length of molar row less than 5; upper incisors with notch in side view (fig. 300) .. ***Mus musculus***

3(1) Zygomatic plate much narrowed, usually slanting backward from lower to upper border (fig. 301); infraorbital foramen usually large, well open (fig. 304); rostrum lengthened (fig. 303; except in the recently discovered ichthyomyine, *Chibchanomys*, which has not been added to this key) 4

Zygomatic plate not narrowed or less narrowed (fig. 302), and tilted more strongly upward (if narrowed, it is always tilted upward, fig. 305); skull without above peculiarities 8

4(3) Foreclaws prominent and long (fig. 306); rostrum especially elongate (fig. 307) .... ***Oxymycterus***, 5

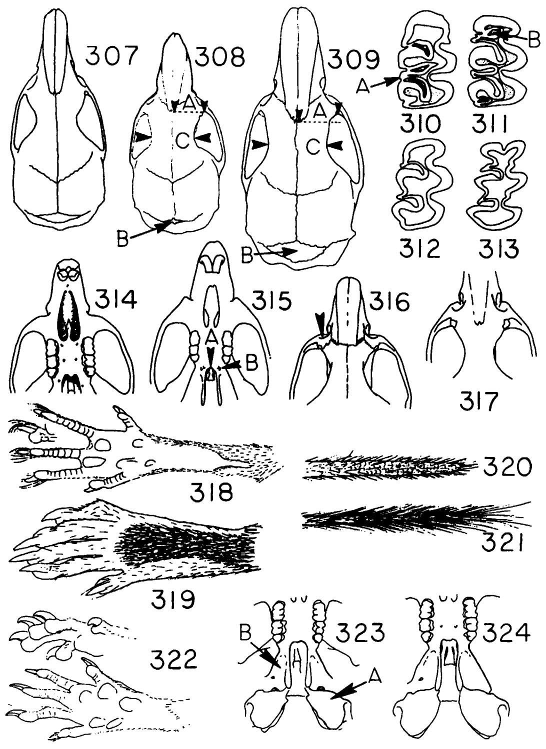
Foreclaws not so prominent and long; rostrum not so elongate 7

5(4) Small, head plus body shorter than 120 mm; skull shorter than 32 (*hucucha* known only from Siberia Cloud Forest at elevation 2800 m) ... ****Oxymycterus hiska*** or ***Oxymycterus hucucha***

Large, head plus body longer than 120; skull longer than 32 6

6(5) Larger, occipitonasal length of skull more than 36 mm in adults; generally below 2500 m elevation ... ***Oxymycterus inca***

Smaller, length of skull less than 36; generally above 2500 m elevation .... ***Oxymycterus paramensis***



7(4) Tail and toes not whitish, pelage generally dark; whitish spot on chin; smaller, length of skull less than 30 mm; nasals not extending behind front of orbit (fig. 308A); interparietal small (fig. 308B), less than 2 mm; interorbital constriction more marked (fig. 308C) . . . . ***Akodon mimus***

End of tail whitish, hairs on toes whitish and contrasting with darker hairs on rest of foot and on dorsal part of head plus body; larger, length of skull more than 30; nasals extending posteriorly behind front of orbit (fig. 309A); interparietal large (fig. 309B), more than 2 mm front to back; interorbital constriction scarcely apparent (fig. 309C) . . . . ***Lenoxus apicalis***

8(3) Molars, especially M1, "pentalophodont," with a distinctly connected mesoloph and mesostyle (fig. 310A), tendency toward enamel islands (fig. 311B) in adults; tail longer than head plus body length . . . . . **Oryzomyini,** 9

Molars "tetralophodont," without a connected mesoloph and mesostyle, teeth simple (fig. 312) or complex (fig. 313), tend not to have enamel islands; tail length variable 32

9(8) Fur spiny or of bristles, head plus body length usually less than 95 mm, skull length less than 25; forests in lowlands up to at least 1500 m elevation . . . . ***Neacomys spinosus***

Fur not spiny or of bristles; small to large 10

10(9) Palate short, anterior margin of mesopterygoid fossa lies anterior to line connecting the posterior margin of molar alveoli (fig. 314); not reaching posterior part of tooth rows; without lateral pits in posterior part, zygomatic notch shallow (fig. 316) 11

Palate reaching behind posterior part of tooth rows (fig. 315A); with conspicuous lateral pits (fig. 315B) except perhaps in *Kunsia*; zygomatic notch shallow or deep (fig. 317) 16

11(10) Feet relatively wide, short, and with strong curved claws (fig. 322); dark patch on top of feet contrasting with paler toes and sides (fig. 319); tail penicillate (fig. 321) . . . . ***Rhipidomys*** (in part), 12

Feet relatively long and slender, and with weaker, less curved claws (fig. 318); tail not penicillate (fig. 320) . . . . ***Thomasomys***, 13

12(11) Smaller, head plus body length about 170 mm; length of skull about 29.5 . . . . ***Rhipidomys couesi***

Larger, head plus body length about 200; skull about 42 . . . . ***Rhipidomys leucodactylus***

13(11) Large, head plus body longer than 140 mm; skull length more than 34 . . . . ***Thomasomys aureus***

Smaller, head plus body shorter than 140; skull shorter than 34 14

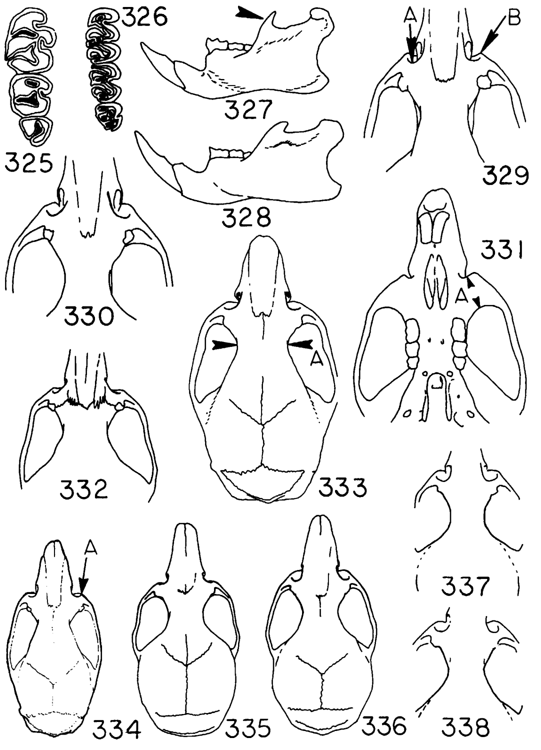
14(13) Larger, head plus body longer than 120 mm; skull longer than 31; hind foot longer than 31; dorsum blackish, velvety . . . . ***Thomasomys ladewi***

Smaller, head plus body shorter than 120; skull shorter than 31; hind foot shorter than 31; dorsum brown 15

15(14) Bullae smaller (fig. 323A); parapterygoid fossa narrower (fig. 323B); venter darker; dorsum brown . . . . ***Thomasomys daphne***

Bullae larger (fig. 324); parapterygoid fossa wider (fig. 324); venter paler; dorsum reddish brown . . . . ***Thomasomys oreas***

16(10) Tail penicillate (fig. 321); outer surface of ears and dorsal surface of tail blackish, gray patches on top of feet (fig. 319),



contrasting with toes and sides of feet; head plus body length about 110 mm .... ***Rhipidomys nitela***

Tail lightly haired, but not penicillate (fig. 320); ears and tail variable in color; feet without dark patches; size variable, small to large 17

17(16) Larger, head plus body of adults longer than 160 mm; hind foot longer than 40; cheekteeth tending to become more or less flat-crowned early; the outer folds of upper molars isolated, or practically so, on crown surfaces as islands, early in life (figs. 325, 326) 18

Smaller, head plus body shorter than 160; hind foot shorter than 40; cheekteeth not tending to become flat-crowned until late in life; cusps usually traceable; less tendency for isolation of outer folds as enamel islands 19

18(17) Outer folds of upper molars isolate as broad islands (fig. 325); general dental pattern simple; M1 and M2 with not more than two isolated islands each .. .. ***Kunsia tomentosus***

Outer folds of upper molars isolate as narrow islands (fig. 326); general dental pattern more complex; M1 and M2 eventually with three or four isolated islands each ..... ***Nectomys squamipes***

19(17) Hind feet shorter and broader (fig. 322), D5 short; coronoid process of mandible longer (fig. 327); zygomatic notch shallower (fig. 329A) ..... ***Oecomys***, 20

Hind feet longer and narrower (fig. 318), D5 longer; coronoid process shorter (fig. 328); zygomatic notch deeper (fig. 330) 22

20(19) Venter whitish and sharply delineated from lateral and dorsal pelage; smaller, hind foot shorter than 24 mm; occipitonasal length less than 28.5; head plus body shorter than 115; alveolar length of upper molar tooth row less than 4.5 .... ***Oecomys bicolor***

Venter not both whitish and sharply delineated; larger, hind foot longer than 24; occipitonasal length more than 28.5; head plus body longer than 115; alveolar length of upper molar tooth row more than 4.5 21

21(20) Dorsal pelage grayish, grizzled or with mixed colors, general appearance not reddish but sometimes tinged with yellowish, venter whitish and tinged with ochraceous or pinkish; skull larger at a comparable age, interorbital region narrower (fig. 329); zygomatic plate wider (fig. 331A); anterior spine of zygomata longer (fig. 329B) .... ***Oecomys mamorae***

Dorsal pelage usually somewhat reddish, mixed with black hairs, venter not as above, but buffy or with much basal gray showing; skull smaller at a comparable age, interorbital region relatively broader (figs. 332, 333A, 334); zygomatic plate narrower (figs. 332, 333, 334), anterior spine shorter (fig. 334A) .... ***Oecomys roberti***

22(19) Size small, head plus body shorter than 100 mm; hind foot generally shorter than 28 mm; skull shorter than 28 23

Size larger, head plus body longer than 100; hind foot generally longer than 28; skull longer than 28 27

23(22) Size small, head plus body length generally less than 80 mm; hind foot small, 20–21; dorsum very dark brown, ears dark brown; venter dark gray; skull (fig. 335) with shallow zygomatic notch; relatively narrow rostrum; expanded zygomatic arches; evenly rounded braincase .... ***Microryzomys minutus***

Head plus body length generally greater than 80; hind foot small to large (20–

28); dorsum golden brown to brown, rarely very dark; venter white to gray, hairs with white tips; skull with well-developed zygomatic notch (figs. 336–338); rostrum not especially narrow; zygomatic arches not greatly expanded; braincase not evenly rounded .... ***Oligoryzomys***, 24

24(23) Tail relatively short, generally less than 120% of head and body length; tail 75–116 mm long; hind foot generally shorter than 23; venter usually with a buffy wash; maxillary tooth row delicate, generally shorter than 3.31 .... ***Oligoryzomys microtis***

Tail relatively long, greater than 130% of head plus body length; tail generally longer than 120%; hind foot usually longer than 24; venter white or gray, rarely with a buffy wash; maxillary tooth row not obviously delicate, generally greater than 3.3 25

25(24) Tail generally greater than 150% of head plus body length; dorsum medium brown with a grizzled appearance, hairs long and fluffy; interorbital region parallel-sided (fig. 337); occurring at moderate to high elevations 26

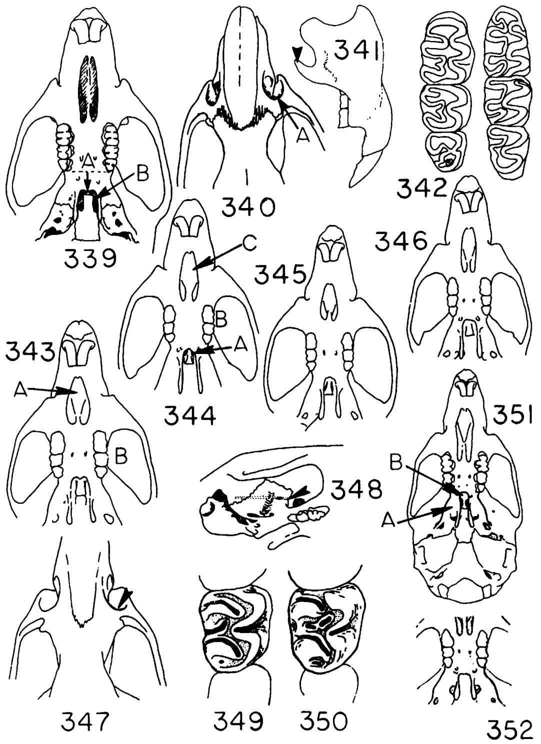
Tail generally less than 150% of head plus body length; dorsum tending to rufous, lined with black hairs; hairs moderately long, not fluffy; venter white; interorbital region of skull with posteriorly divergent sides (fig. 338); occurring at low elevations in southeastern Bolivia .... ***Oligoryzomys chacoensis***

26(25) Darker, bottom of tail slightly paler than top; pelage shorter, width of basal gray band when hair parted on rump about 4.5 mm, total length of hair about 5.5 .... ***Oligoryzomys destructor***

Paler, tail noticeably bicolored, bottom whitish to gray; pelage longer and softer, width of basal gray band when hair parted on rump about 5.5, total length of hair about 7.5 .... ***Oligoryzomys flavescens***

27(22) Palate very long, extending well past the posterior edge of M3 (fig. 339A); zygomatic notch deep (fig. 340A); sphenopalatine vacuities present (fig. 339B); deep lower jaw with a long coronoid process (fig. 341); teeth when moderately worn as shown in fig. 342 .... ***Pseudoryzomys simplex***

Palate not so long, extending just past M3 (figs. 343–346); zygomatic notch less deeply excised (as in fig. 347, or shallower); sphenopalatine vacuities small or absent (figs. 343, 344A, 345, 346); coronoid process not so long (fig. 327) .... (also see text) ***Oryzomys***, 28



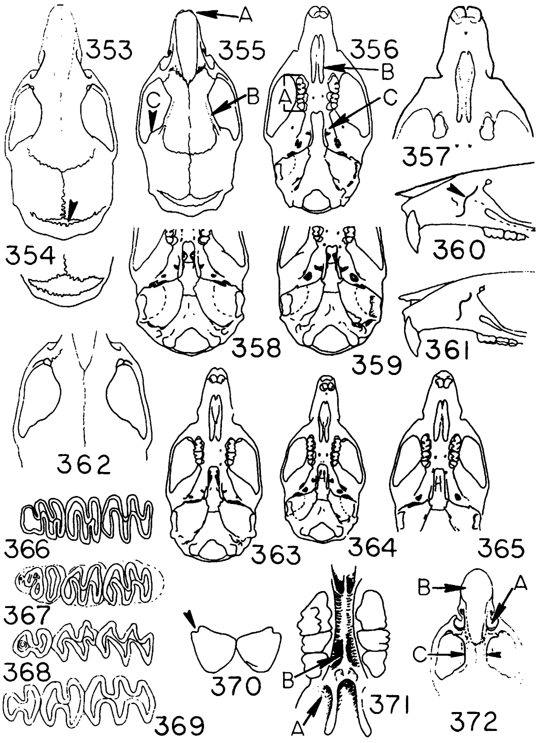
28(27) Larger, head plus body longer than 145 mm, occipitonasal length greater than 35; hind foot longer than 33 29

Smaller, head plus body shorter than 145; occipitonasal length less than 35; hind foot shorter than 33 30

29(28) Reddish, darker, tail dark below, ears blacker; venter whitish in general appearance but bases of hairs blacker; incisive foramina broader (fig. 343A); molar teeth larger (fig. 343B) .... ***Oryzomys levipes***

Yellowish, paler, tail paler below, ears less blackish; venter more buffy and bases of hairs gray; incisive foramina relatively narrow and longer (fig. 344C); teeth smaller (fig. 344B) .... ***Oryzomys subflavus***

30(28) Tail relatively longer, whitish below on basal part and contrasting strongly with darker dorsal part; incisive foramina longer (fig. 346); anterior zygomatic notch relatively deep and wide (fig. 347); squamoso-alisphenoid groove present (fig. 348) .. ***Oryzomys nitidus***



Tail relatively shorter, slightly paler below, but less contrasting with darkness of dorsal part; incisive foramina shorter (fig. 345); anterior zygomatic notch not so deep and wide; groove absent 31

31(30) Venter paler; enamel island in M2 absent (fig. 349); occurring in the lowlands below 500 m elevation .... ***Oryzomys capito***

Venter darker gray; enamel island in M2 present (fig. 350); occurring in the Yungas above 1000 m elevation .... ***Oryzomys yunganus***

32(8) Dentition rather weak, molars narrow (figs. 312, 313), the folds usually not approaching each other and not well marked; teeth wear early, simplifying structure; parapterygoid fossa relatively narrow (fig. 351A), and mesopterygoid fossa relatively broad (fig. 351B), interparietal narrow (fig. 353) .... **(akodonts)**, 33

Dentition not as above; parapterygoid fossa relatively broad (fig. 352), mesopterygoid fossa relatively narrow; interparietal not narrow (fig. 354) .... **(phyllotines, sigmodonts)**, 46

33(32) Nasals relatively short and upper incisors relatively procumbent (fig. 355A); rostrum short and less sharply set off from the slope of the anterior part of zygomatic arch; supraorbital borders posteriorly divergent and angular to beaded (fig. 355B); anterior wall of braincase tending to angularity (fig. 355C); parapterygoid fossa narrow (fig. 356C) .. .. ***Bolomys***, 34

Nasals longer and incisors not procumbent (fig. 353); rostrum not so short and usually more distinct; supraorbital edges less strongly divergent posteriorly, rounded or slightly angular; parapterygoid fossa not so narrow (fig. 351) ... . ***Akodon***, 36

34(33) Smaller, head plus body shorter than 110 mm; hind foot shorter than 22; crown length of tooth row less than 4.5; pelage paler, with ochraceous hues and whitish venter; inhabiting highlands of the northern altiplano and valles areas ... . ***Bolomys amoenus***

Larger, head plus body longer than 110; hind foot longer than 22; tooth row (fig. 356A) longer than 4.5; pelage darker gray or blackish 36

35(34) Pelage dark, venter gray, feet blackish; upper incisors less procumbent and yellower; incisive foramen wider, shorter, not constricted posteriorly (fig. 356B); inhabiting lowlands below 800 m elevation .... ***Bolomys lenguarum***

Pelage not so dark, venter ochraceous, feet dark gray; incisors more procumbent, whiter; incisive foramen narrow, longer, constricted posteriorly (fig. 357) .... ***Bolomys lactens***

36(33) Smaller, crown length of maxillary tooth row usually less than 4.3 mm; greatest length of adult skull usually less than 28 37

Larger, tooth row usually longer than 4.3; adult skull usually longer than 26 41

37(36) Bullae enlarged (fig. 358) 38

Bullae not especially enlarged (fig. 359) 39

38(37) Pale and ochraceous, venter gray with buffy wash; smaller, maxillary tooth row shorter than 3.6 mm .... ***Chroeomys andinus***

Darker, not ochraceous, dorsum with mixture of darker and paler hairs, venter whitish; maxillary tooth row (dimension shown in fig. 356A) longer than 3.6 mm .... ***Akodon albiventer***

39(37) Small, hind foot shorter than 16 mm; greatest length of skull less than 24; maxillary tooth row shorter than 3.5;

living above 3000 m elevation .... ***Akodon lutescens***

Larger, hind foot longer than 16; greatest length of skull 22 to 26; some living as low as 2000 m elevation 40

40(39) Darker brown dorsum, dark gray venter without buffy wash; anterior margin of zygomatic plate sloping (fig. 360) .... ***Akodon subfuscus***

Paler brown dorsum, buffy or ochraceous venter; anterior margin of zygomatic plate vertical (fig. 361) .... ***Akodon boliviensis***

41(36) Colorful, white spots at base of ear, white venter contrasts with dark dorsum, fulvous on nose, hind feet, and tail; interorbital region hour glass-shaped (fig. 362); bulla large (fig. 363); inhabiting higher elevations, above 3000 m .... ***Chroeomys jelskii***

Not colorful, relatively drab brownish or blackish; bulla small; generally at elevations below 3000 m 42

42(41) Blackish or dark brown, venter not greatly contrasting with dorsum; hairs relatively short, soft; tail not obviously or sharply bicolored 43

Not so dark, hairs generally longer, mixture of dark and pale hairs more noticeable on dorsum; tail more obviously bicolored; venter pale gray .... ***Akodon varius* group (including *A. varius, A. pervalens, A. toba, A. sylvanus, A. simulator*)**

43(42) Long rostrum (fig. 364); zygomatic arch and plate smaller anteriorly 44

Normal rostrum (fig. 365, shows *A. dayi*) 45

44(43) Pelage darker; braincase less inflated, breadth of braincase less than 12 mm; smaller, condyloincisive length of skull less than 24.3; rostrum not so long ... . ***Akodon fumeus***

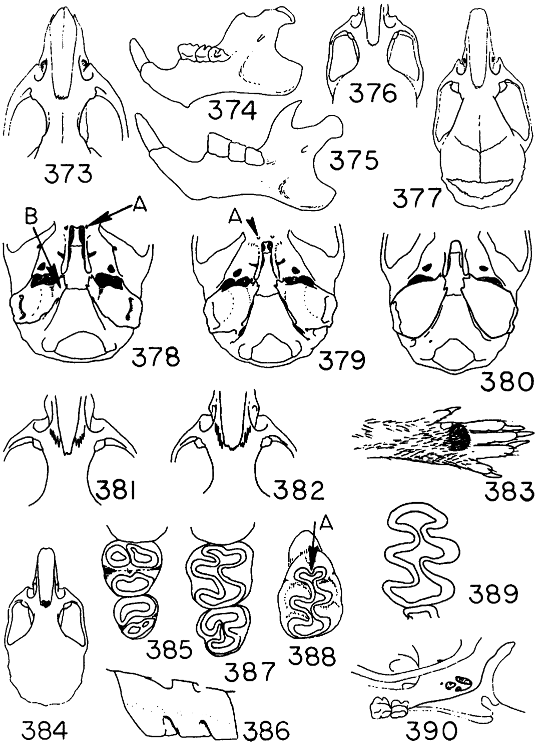
Pelage not so dark; braincase more inflated, breadth of braincase more than 12; larger, condyloincisive length of skull generally more than 24.3; rostrum longer and narrower ... ***Akodon siberiae***

45(43) Hind foot longer than 22 mm (up to 30) .... ***Akodon dayi***

Hind foot shorter than 27 .... ***Akodon aerosus***

46(32) Molars with compressed folds (figs. 366, 367), occlusal surface flat; parapterygoid fossa relatively deep (fig. 371)... 47

Molars without compressed folds (figs. 368, 369), occlusal surface flat, cuspidate, or some intermediate condition; parapterygoid fossa not so deep .. 48



47(46) Nose conspicuously rust-colored; hind foot about 25 mm long; upper incisors clearly grooved (fig. 370, showing a cross section of teeth); upper tooth row as in fig. 366; deep posterior palatine pits (fig. 371B); zygomatic notch relatively wide (fig. 372A); nasals widely flared anteriorly (fig. 372B); interorbital region unusually narrow (fig. 372C); jaw deep and coronoid process small (fig. 374); occurring at elevations above 2500 m .... ***Neotomys ebriosus***

Nose not conspicuously rust-colored; hind foot longer than 35; upper incisors not grooved; upper tooth row as in fig. 367; without deep palatal pits; zygomatic notch not so wide; nasals not widely flared; interorbital region not so narrow (fig. 373); jaw relatively slender (fig. 375), coronoid process curved and pointed; inhabiting elevations below 2500 m .... ***Holochilus sciureus***

48(46) Tail variable from longer than to slightly shorter than head plus body length (the former more common) and with distinctly penicillate tip (less hairy than fig. 321, but more than in fig. 320) 49

Tail shorter than, or occasionally equal to, head plus body length; without a distinctly penicillate tip (fig. 320) . . . 54

49(48) Skull with constricted interorbital region and greatly flared zygomatic arches (fig. 376); teeth high-crowned; bullae less inflated (figs. 378, 379) ***Phyllotis*, 50**

Interorbital region posteriorly divergent (fig. 377), occasionally ridged; zygomatic arches flared or not; teeth less high-crowned; bullae generally more inflated (fig. 380) 51

50(49) Posteropalatal pits small and usually lateral to mesopterygoid fossa (fig. 378A); bullar tubes relatively long and tubular (fig. 378B); nasals usually pointed behind and extending behind the premaxillaries (fig. 381); ear smaller; tail less hairy . . . . ***Phyllotis osilae***

[specimens from populations assigned to two other species, *P. caprinus* and *P. wolffsohni* will probably key out here to *P. osilae*; see text for other characters].

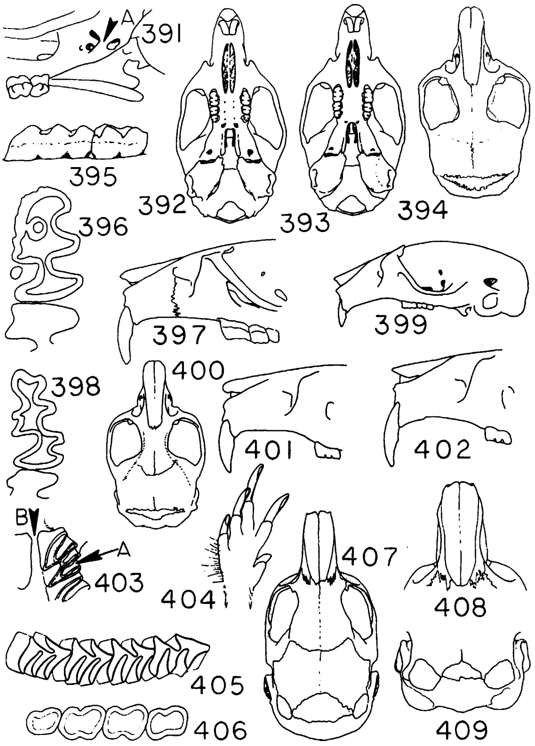
Posteropalatal pits anterior to fossa (fig. 379A); bullar tubes not unusually long and tubular (fig. 379); nasals usually less pointed and not extending behind premaxillae (fig. 382); ears large; hairier tail, with or without pectoral streak; rostrum not heavy . . . . (formerly in ***P. darwini***), ***Phyllotis chilensis*** or ***P. xanthopygus***

51(49) Palms and soles with hairy pads (fig. 383); head plus body shorter than 100 mm; interorbital region weakly divergent posteriorly (fig. 384), not ridged; teeth low-crowned . . . . ***Eligmodontia puerulus***

Palms and soles without distinct hairy pads; size medium, head plus body longer than 100; interorbital region strongly divergent posteriorly and with edges slightly elevated (fig. 377) . . . . ***Graomys*, 52**

52(51) Ventral pelage white, sharply demarcated from dorsal color; ear with white spot below its base; teeth low-crowned, tending to form lophs (fig. 385); anterocone may be divided (fig. 388A); no alisphenoid strut (fig. 390) . . . . ***Graomys pearsoni***

Ventral pelage gray; no conspicuous white spot at base of ear; teeth high-crowned (fig. 386), tending not to form lophs (fig. 387); anterocone entire (fig. 389); alisphenoid strut present (fig. 391A). . . .53



53(52) Olivaceous (as in juvenals of *G. griseoflavus*) to rufous; hairs of ventral surface dark basally; bullae smaller; incisive foramina longer; M3 relatively smaller (fig. 392); 2*n* = 28 . . . . ***Graomys domorum***

Buffy to tawny; basal parts of hairs of underparts white to plumbeous; bullae larger; incisive foramina shorter; M3 relatively larger (fig. 393); 2*n* = 36–38 . . . . ***Graomys griseoflavus***

54(48) Teeth high-crowned, tendency to be prismatic; anterocone entire (figs. 368, 369); greatly flared zygomatic arches; interorbital region greatly constricted (fig. 394) 55

Teeth low-crowned (fig. 395), not prismatic; divided anterocone (fig. 388, shows *C. callosus*); zygomatic arches not greatly flared; interorbital region generally not constricted . . . . ***Calomys*, 60**

55(54) Upper molar teeth as in fig. 369; m1 as in fig. 396; rostrum as in fig. 397; large (head plus body about 160 mm long in adults); distinct pattern of black, gray, and white markings . . . . ***Chinchillula sahamae***

Teeth and rostrum not as above; size moderate; lacking distinct pattern of black, gray, and white markings 56

56(55) Size moderate, head plus body usually longer than 140 mm in adults; pelage relatively uniform gray; rostrum as in fig. 302; first lower molar exceptionally complex (fig. 398); teeth prismatic (fig. 368) .... ***Andinomys edax***

Size smaller, head plus body shorter than 140; pelage various; rostrum not as above; m1 not as above; teeth not prismatic 57

57(56) Skull much bowed in dorsal profile (fig. 399); anterior roots of zygomatic arch widely spreading (fig. 394 shows this species) .... ***Galenomys garleppi***

Skull less bowed; anterior roots of zygomatic arch less widely spreading (fig. 400, shows *A. sublimus*) 58

58(57) Tail shorter than 70 mm; upper incisors sometimes faintly grooved, somewhat proodont, white or pale yellow .... ***Auliscomys sublimis***

Tail longer than 70; upper incisors slightly yellower 59

59(58) Upper incisors with longitudinal grooves, yellow or orange, not proodont (fig. 401); head plus body shorter than 125 mm; ear length from notch shorter than 25; soles of feet pale .... ***Auliscomys pictus***

Upper incisors without longitudinal grooves, pale yellow, distinctly proodont (fig. 402); head plus body of adults longer than 125; ears longer than 25; well clothed with hair and with tuft of long hair at base; soles of hind feet blackish .... ***Auliscomys boliviensis***

60(54) Edges of supraorbital region divergent posteriorly (fig. 377) and with distinct ledges in adults 61

Edges of interorbital region parallel or divergent posteriorly, occasionally with slight beading, but never heavy ridges 63

61(60) Greatest length of skull in adults more than 24 mm; hind foot longer than 20; maxillary tooth row generally longer than 4.1; head plus body length generally greater than 90; total length greater than 200; occurring at moderate elevations 1000 to 2700 m .... ***Calomys venustus***

Greatest length of skull less than 26; hind foot shorter than 21; maxillary tooth row shorter than 3.8; head plus body length less than 90 62

62(61) Maxillary tooth row generally 3.7 to 4.0 mm; greatest length of skull of adults generally greater than 24 mm; total length generally greater than 170 mm and less than 210 mm; venter light to dark gray, no reddish tint above or below; alisphenoid strut not generally present, $2n = 50$ .. ***Calomys callosus***

Maxillary tooth row generally 3.2 to 3.6; greatest length of skull of adults generally less than 24 mm; total length generally less than above; venter often dark and body frequently with a reddish or chestnut color; alisphenoid strut usually present, $2n = 66$ .... ***Calomys tener***

63(60) Tail shorter than 60 mm 64

Tail longer than 60, may be equal to head plus body length 65

64(63) Dorsal pelage marbled in appearance, fluffy; hairs of venter gray-based; tail very short, less than one-half of head plus body length; rostrum narrow; maxillary tooth row longer than 3.2 mm; occurring at elevations above 3000 m .... ***Calomys lepidus***

Dorsal pelage not marbled, short hairs; venter white; tail more than one-half of head plus body length; rostrum not narrowed; maxillary tooth row shorter than 3.3; occurring in the Chaco of southeastern Bolivia, at elevations of less than 1000 m .... ***Calomys laucha***

65(63) Tail approximately equal to head plus body length; dorsum golden brown lined with black hairs; sides of interorbital region divergent posteriorly; occurring at moderate to high elevations (2000 to 3500 m) in the eastern slopes .... ***Calomys musculinus***

Tail shorter than head plus body; dorsum brown; sides of interorbital region parallel; occurring at high elevations in the vicinity of Lake Titicaca .... ****Calomys sorellus***

KEY 24

GENERA AND SPECIES OF ECHIMYIDAE IN BOLIVIA

1 Cheekteeth broader than 3 mm; reentrant folds deep and persistent (fig. 403A); palate constricted anteriorly to less than 2 mm breadth (fig. 403B); digits relatively long and slender; claws of forefeet resemble keeled nails over a pad about as long as the claw .... **Subfamily Dactylomyinae, *Dactylomys boliviensis***

Cheekteeth narrower than 3 mm; reentrant folds may isolate as narrow islands in adults (fig. 61B); palate narrower anteriorly but not greatly constricted, breadth between alveoli at least 2 mm; digits and claws of forefeet not as described above .... (also see *Mesomys* in text) 2

2(1) Cheekteeth smaller, with narrow folds that typically become isolated as islands in adult; length of first upper cheektooth less than 2.5 mm; occlusal length of upper molariform tooth row less than 10; feet not specially adapted for climbing, narrower, width of hind foot less than 10; claws less curved, blunter .... ***Proechimys* sp.**

[at least five species occur in Bolivia, see text for further details]

Cheekteeth heavier, with more persistent folds, the general effect complex, folds isolating late or not at all; length of occlusal surface of first upper cheektooth more than 2.5; occlusal length of upper molariform tooth row more than 10; feet adapted for arboreal life, broader, width of hind foot more than 10 in adults; claws more curved, sharper 3

3(2) Fur soft, tail abundantly haired, almost bushy; base of tail reddish brown, distal two-thirds black; top of head has paler brownish patch contrasting with blackish surrounding areas .... ***Isothrix bistriata***

Fur bristly or spiny, scalation of tail evident, not well haired; color not as above on tail and head 4

4(3) Area around nose chestnut-colored; body rather uniform in color; long hairs growing from tips of ears; tail with scattered hairs, scales mostly visible; spines smaller; tail about as long as head plus body, without distal tuft .... ***Echimys didelphoides***

Area around nose not chestnut-colored; without long hairs on tips of ears; spines heavier; tail longer than head plus body, with tuft at end .. ****Echimys macrurus***

KEY 25

GENERA AND SPECIES OF ABROCOMIDAE AND OCTODONTIDAE IN BOLIVIA

1 Ears large, longer than 15 mm; forefeet not especially enlarged, longest claw shorter than 5; skull not heavily ridged 2

Ears small, shorter than 10; forefeet enlarged for digging (fig. 404), longest claw more than 5; skull heavily ridged, especially the zygomatic arches ..... **Subfamily Ctenomyinae, *Ctenomys*, 4**

[also see text and map; additional taxa remain to be described, and these are not included in this key]

2(1) Lower teeth simplified (fig. 406); tail bushy; rostrum less slender (fig. 408) .. .. ***Octodontomys gliroides***

Lower teeth complex (fig. 405); tail haired but not bushy; rostrum slender (fig. 407) .. **Family Abrocomidae, *Abrocoma*, 3**

3(2) Tail short, less than 50% of length of head plus body; pelage pale gray; bullae enormous, projecting posteriorly beyond occipital (fig. 409), gap separating bullae at midline less than 1 mm; known from Tarija .... ***Abrocoma cinerea***

Tail long, more than 50% of length of head plus body; pelage brownish gray; bullae large, not projecting beyond occipital (fig. 407), gap more than 1 mm; known from western Santa Cruz .... ***Abrocoma boliviensis***

4(1) Size large, hind foot longer than 55 mm; greatest length of skull more than 65; pelage coarse, shaggy, reddish brown; inhabiting the Gran Chaco in southeastern Bolivia .... ***Ctenomys conoveri***

Size smaller, hind foot shorter than 55; greatest length of skull less than 65; pelage not as above 5

5(4) Pelage short, few hairs of dorsum longer than 15 mm; nasal bones relatively short, broad, and truncated anteriorly (fig. 410) 6

Pelage long, most hairs of dorsum longer than 15; nasal bones longer, narrower, and not truncated anteriorly (fig. 411) 8

6(5) Size small, hind foot shorter than 35 mm; head plus body length less than 175; greatest length of skull less than 45; rostrum short (fig. 410); inhabiting eastern Santa Cruz .... ***Ctenomys minutus***

Size larger, hind foot longer than 35; head plus body length more than 175; greatest length of skull more than 45 7

7(6) Pelage blackish; postorbital processes farther forward (fig. 412); inhabiting western Santa Cruz .... ***Ctenomys steinbachi***

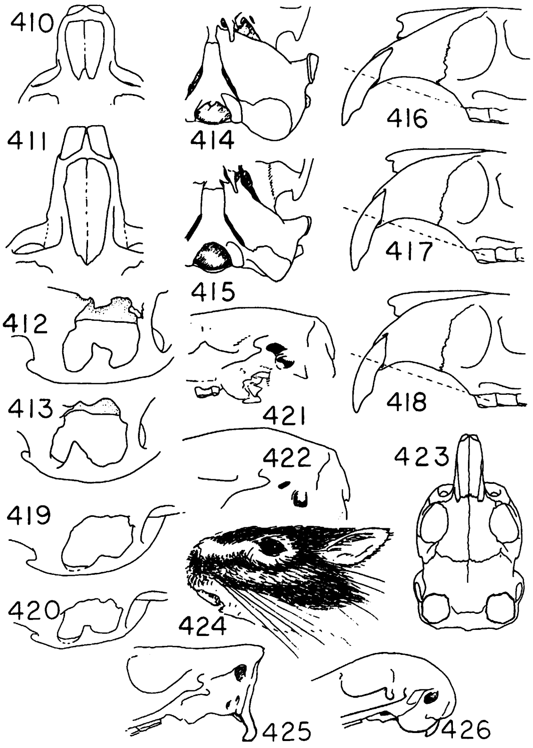
Pelage brown; postorbital processes farther back (fig. 413); widely ranging in Santa Cruz .... ***Ctenomys boliviensis***

8(5) Pelage pale reddish tan (in unworn pelage); bullae large (fig. 414) .... ***Ctenomys opimus***

Pelage varying from tan to blackish; bullae not expanded (fig. 415) 9

9(8) Dorsal pelage pale reddish tan; upper incisors unusually procumbent (fig. 416) and pale; occurring to the south of Lake Titicaca .... ***Ctenomys leucodon***

Dorsal pelage brown to blackish; upper incisors not unusually procumbent (figs.



417, 418) and pale; occurring in the Valles Area from the city of Potosí southeastward 10

10(9) Pelage usually with distinct cinnamon hue; width of an upper incisor greater than 3.3 mm; incisors more procumbent (fig. 417); postorbital process of jugal more anterior (fig. 419); braincase less vaulted (fig. 421) . . . . *Ctenomys lewisi*

Pelage dark brown; width of an upper incisor less than 3.3; incisors less procumbent (fig. 418); postorbital process more posterior (fig. 420); braincase more vaulted (fig. 422) . . . . *Ctenomys frater*

KEY 26

GENERA AND SPECIES OF CHINCHILLIDAE IN BOLIVIA

1 Pale gray, with neither yellowish belly nor black and white markings on head; length of skull less than 65 mm; interorbital breadth less than 15; bullae inflated, visible as conspicuous areas (width more than 10) on top of skull (fig. 423) and nearly meeting at midline below; probably extinct in Bolivia . . *Chinchilla chinchilla*

Color not as above; larger, length of head plus body more than 350; skull longer than 65; interorbital breadth more than 15; bullae less inflated, not visible as large areas on top of skull, and not nearly meeting (separation more than 4) below 2

2(1) Black and white areas on head (fig. 424), head bulky, belly whitish; tail relatively shorter, length usually less than 200 mm; larger, head plus body more than 435; occipitonasal length of skull more than 90; bullae less inflated and paroccipital processes projecting prominently below (fig. 425); inhabitant of Gran Chaco region at elevations of less than 500 m . . . . *Lagostomus maximus*

No striking markings on head, belly yellowish; more delicate in build; tail longer, length usually more than 200; smaller, head plus body shorter than 435; occipitonasal length less than 90; bullae more inflated and paroccipital processes barely projecting below bullae (fig. 426); inhabitant of rocky areas in high mountains . . . . *Lagidium viscaccia*

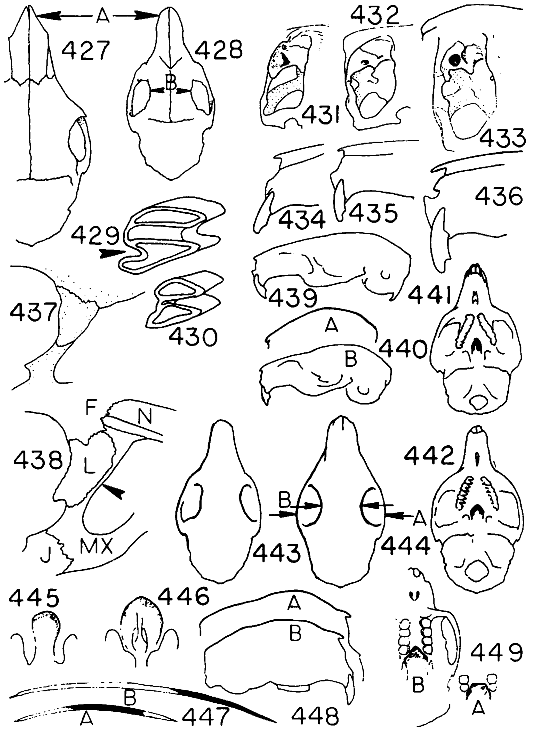
KEY 27

GENERA AND SPECIES OF CAVIIDAE IN BOLIVIA

1 Larger, head plus body longer than 350 mm; skull longer than 80 mm; ears longer than 90; relatively long-limbed, radius longer than humerus, hind foot longer than 70; nasals attenuated (fig. 427A); interorbital region broad, breadth at constriction more than 18 (fig. 427); posterior margin of bony palate a long "V" with anteriormost point at about the level of front of third molariform tooth . . . . **Subfamily Dolichotinae,** ***Dolichotis salinicola***

Smaller, head plus body shorter than 350; skull shorter than 80; ears shorter than 90; relatively short limbed, radius shorter than humerus, hind foot shorter than 70; nasals not so attenuated (fig. 428A); interorbital region narrower (fig. 428B), at constriction less than 18; posterior margin of palate a broader "U" with anteriormost point at level of middle of fourth (last) molariform tooth (figs. 441, 442) . . . . **Subfamily Caviinae,** 2

2(1) Teeth less simplified, breadth of occlusal surface more than 2.5 mm, posterior lobe of upper cheekteeth with clear and deep outer reentrant fold (fig. 429); averages larger, head plus body longer than 215; skull length 50 or more, zygomatic breadth greater than 31; large rounded fo-



ramen in lacrimal (fig. 433); rostrum deep, incisors relatively recumbent (fig. 436); wild or domesticated . . . *Cavia tschudii*

Teeth more simplified, breadth of occlusal surface less than 2.5, posterior lobe of upper cheekteeth without clear and deep outer reentrant fold (fig. 430); averages smaller, head plus body shorter than 270; skull length less than 60, zygomatic breadth less than 34; lacrimal not with large rounded foramen (figs. 431 and 432); rostrum not so deep, incisors may be more procumbent (figs. 434 and 435); generally paler in pelage 3

3(2) Incisors pigmented orange at front, each upper incisor broader than 1.4 mm; incisors relatively recumbent (fig. 435); orbital branch of maxilla completely interrupted by lacrimal (fig. 437); lacrimal foramen relatively small and less lateral in position at front of orbit (fig. 432); skull less bowed in profile (fig. 439); length of parietal usually more than 15; not so pale and grayish, more agouti appearance in pelage; gular skin with bare area in middle . . . . *Galea*, 4

Incisors not pigmented but whitish and narrow, each upper incisor less than 1.4 wide; incisors procumbent (fig. 434); orbital branch of maxilla not completely interrupted (fig. 438); lacrimal foramen relatively large and more lateral (fig. 431); skull bowed in dorsal profile (fig. 440); bullae relatively larger (fig. 440); parietal length 15 or less; feet heavier, breadth across pad of hind foot more than 8, across front foot more than 6; pale and grayish; gular skin completely covered with hair . . . . *Microcavia*, 5

4(3) Whitish eye ring larger; mesopterygoid fossa deep and narrow, with more or less diverging sides (fig. 441); first prism of M1 smaller than second; zygomatic arches spread widely (fig. 443); interorbital breadth averages about 16 mm; averages smaller, occipitonasal length of skull about 52; hind foot usually about 39 . . . . *Galea musteloides*

Eye ring smaller; mesopterygoid fossa broad and with parallel sides (fig. 442); zygomatic arches spread less widely (fig. 444A); interorbital constriction narrower (fig. 444B); averages larger, occipitonasal length of skull about 57; hind foot of adults usually about 42 . . . *Galea spixii*

5(3) Skull smaller, greatest length (average for adults) about 44.3 mm; dorsal profile of skull more rounded (fig. 440A); mesopterygoid fossa pointed (fig. 446); incisors proodont (fig. 434) . . . *Microcavia niata*

Skull larger, greatest length (average for adults) about 46.8; profile straighter (fig. 440B); mesopterygoid fossa rounded (fig. 445); incisors orthodont (similar to those in fig. 435); occurs in Argentina, not yet reported from Bolivia . . . . *Microcavia australis*

KEY 28

SPECIES OF ERETHIZONTIDAE IN BOLIVIA

Quills substantial, with white tips that contrast with dark areas (fig. 447A); larger, occipitonasal length of adult skull more than 85 mm; alveolar length of upper tooth row more than 20.5; forehead highly inflated (fig. 448A); posterior margin of palate broadly U-shaped (fig. 449A) . . . . *Coendou prehensilis*

Quills more variable in size and in ratios of length to diameter, quills on shoulders and surrounding areas relatively long and slender (fig. 447B); quills have dark tips; smaller, occipitonasal length less than 90; alveolar length of upper molar tooth row less than 20.5; forehead less inflated (fig. 448B); posterior margin of palate somewhat V-shaped (fig. 449B); width of upper incisor less than 3.2 . . . . . . *Coendou bicolor*

METHODS AND MATERIALS

I have seen or have records of more than 36,900 specimens of Bolivian mammals. A single identifiable specimen with reliable data is sufficient evidence to plot a dot on a distribution map. However, the adequacy of samples depends on the question(s) being asked. Material for study may seem abundant, but although Bolivia is a large and diverse country with more than 320 species of native mammals, more species remain to be discovered. The mean number of specimens per species is about 115; however, numbers vary from 1 to 2914 and the median number is only 26. Clearly, species are not equally represented in the total sample, and most are poorly represented. Actual rarity in some cases, small ranges within Bolivia, little collecting in the appropriate range or habitat, and inadequate methods of collecting all have contributed to this poor representation. Further indication of the situation is the number of localities per species, which ranges from 1 to 169 with a median of 11.

A "series" is defined for present purposes as a sample of one or more specimens of one species from one place. The number of such samples is about 7300. Thus, the average number of specimens per series is only five. Specimens in 2836 series of rodents were tallied for figure 450. Over half of all series consist of only one or two specimens.

For a given species, the series also tend to be distributed in the same highly skewed way; the most common number of specimens in a series is one, then two. Because of the disproportionate influence of a few large val-

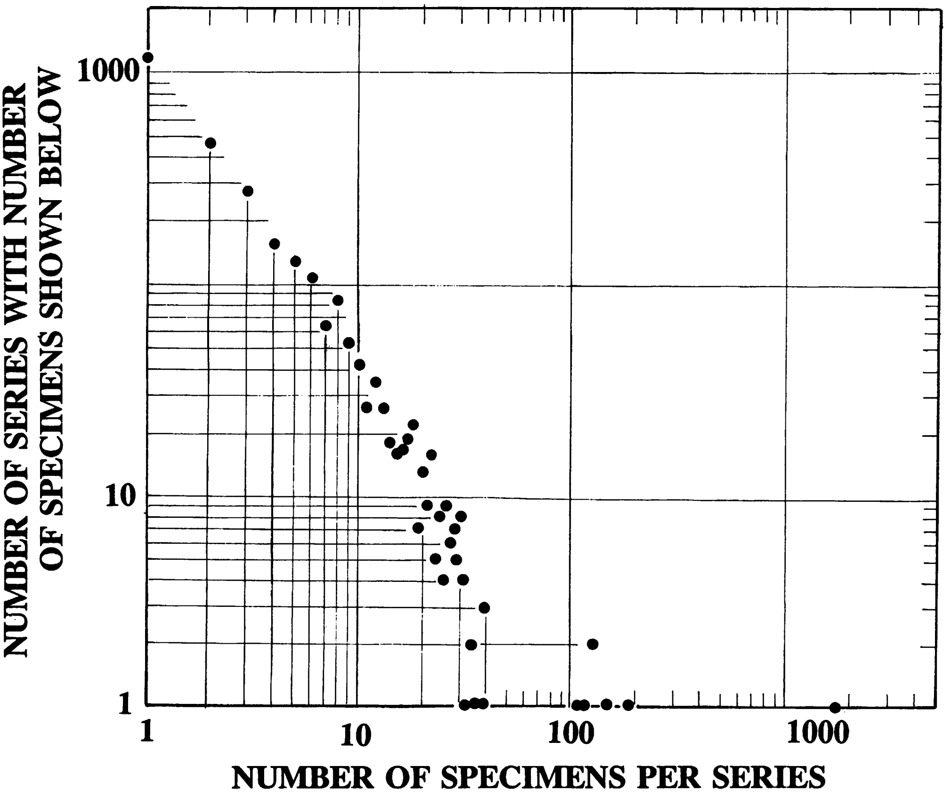


Fig. 450. Graph to indicate the small size of most samples of mammals available for study in collections. A series is defined as the specimen(s) of one species from one locality. Data for 2836 series of Bolivian rodents were tabulated for this graph. The most common series size is one specimen; and more than half of all series (1583 of 2836) consist of only one or two specimens.

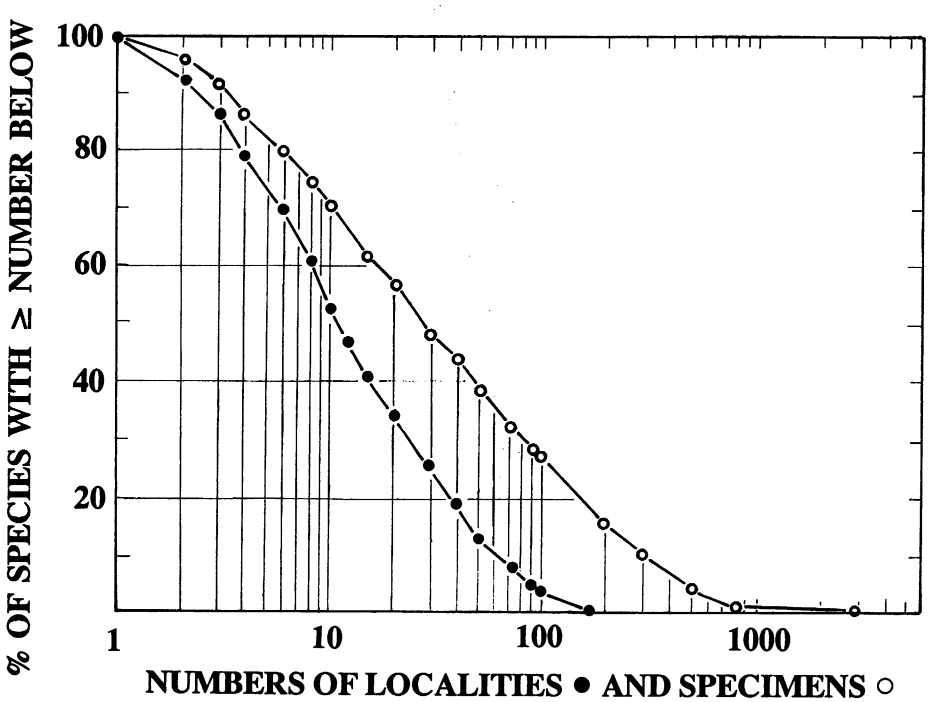


Fig. 451. Cumulative semilogarithmic graph showing the percentage of species of mammals represented by different numbers of specimens and localities for Bolivia. For example, 80% of species are represented by more than four localities and 80% are represented by more than six specimens; the reciprocals are 20% represented by fewer than five localities and 20% by fewer than seven specimens.

ues on arithmetic means, these means are greater than the medians. For example, the average number of specimens per series is five and the median is two. For bats, the average number of specimens per series is 5.4; for rodents it is 5.9; and for other mammals it is 2.8. The largest series consists of 1706 specimens of *Calomys callosus* from San Joaquín. This species of rodent was found to carry the Machupo virus that caused a hemorrhagic fever that killed about 10% of the people in that village during an epidemic in the early 1960s (Johnson et al., 1965). This large series of mice was collected during studies at San Joaquín. No other series numbering more than 1000 exists. The entire representation for only two other species exceeds 1000. These are the common bats *Myotis nigricans* and *Molossus molossus*. The size of the samples of these two species also is largely the result of single series of 465 and 413, respectively, obtained in the early stages of the study of hemorrhagic fever at San Joaquín when researchers investigated the possibility that bats might be transmitting the disease.

To study geographic variation, a number of series from different parts of the range of a species and consisting of at least 10 adult specimens per series are needed. The number 10 is only a rough minimal approximation. More are needed when measurements or counts are highly variable or sexual dimorphism is pronounced. Only 14% (389 of 2836) of the series of rodents consists of 10 or more specimens. Few species are represented by series adequate for this type of study and even fewer species have been critically studied from this standpoint, by me or anyone else.

Neither the numbers of specimens nor localities per species are normally distributed; both are highly skewed, with lower values predominating.

The percentages of species represented by different numbers of localities and specimens are shown in figure 451. Values at the 50th percentile are the medians of 11 localities

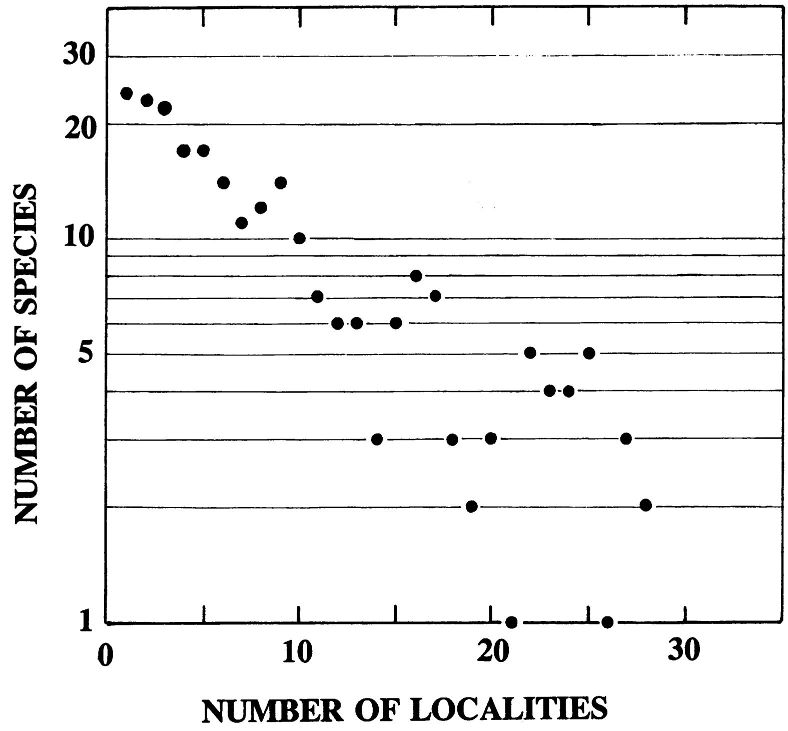


Fig. 452. Semilogarithmic graph showing the number of localities per species of Bolivian mammals. In general, the most common number (for 24 species) is one locality, then two (23 species), then three (22 species), etc. Data for 240 species known from fewer than 30 localities are plotted; 82 additional species are known from 30 to 169 localities. For values from 30 to 39, the average number of species is 2.3; for the 40s the average is 1.7; for 50s, it is 1.5; for 60s, it is 0.3; etc. The downward trend seen in the graph continues for the scattered values above 30 localities.

and 26 specimens per species. The values at any other percentile can be read approximately from the graph.

The area of Bolivia is 1,098,581 km^2 (Instituto Nacional de Estadistica, Atlas censal de Bolivia, 1982). The total of 36,900 specimens thus represents one specimen per 30 km^2. In comparison, an unusually detailed North American faunal study of mammals in the state of Arizona (Hoffmeister, 1986) was based on 42,278 specimens representing 138 native species. The area of Arizona is 295,144 km^2, so there was one specimen per 7 km^2. Arizona is, therefore, between four and five times better represented in collections of mammals and correspondingly better known than Bolivia. The number of specimens per species on the average in Arizona is 306, compared to 115 in Bolivia.

The numbers of species that are represented by different numbers of localities are summarized in figure 452. Note the predominance of small samples.

We now have a much better idea of what species are present and their geographic distributions within Bolivia than we had a few years ago, but much more remains to be learned about taxonomy and distribution. Other biological aspects, such as ecological relationships with the physical environment and with other species of both plants and animals, behavior, population levels and fluctuations, reproduction, genetics, parasitology, epidemiology, public health, conservation biology, wildlife management, and economic impacts are virtually unexplored and offer exciting fields for study. I hope that the present progress report on taxonomy and distribution will provide some ideas and incentives for this future work.

FAUNAL ANALYSIS AND BIOGEOGRAPHY

Geological, topographic, climatic, and vegetational factors are among the major environmental influences on mammalian distributions and populations. These will be outlined only in a general way, to provide a background for the discussion of mammalian biogeography. Some diverse mammalian habitats are illustrated in figures 453 to 469. These photos, arranged by elevation, were taken from 5000 m in the Cordillera Oriental of the Andes down to 200 m in the Amazonian lowlands.

GEOGRAPHICAL POSITION AND TOPOGRAPHY

Bolivia extends in latitude from approximately 10 to 23° south of the equator. These latitudes, and great topographic relief, are major factors in maintaining diverse climates and mammalian habitats. These habitats range from humid, high (i.e., tall) tropical forest in the north to areas of perpetual snow and glaciers on the cordilleras that are relatively barren biologically. Bolivia can be roughly divided into lowlands and highlands. The northern and eastern two-thirds of Bolivia lie at elevations less than 500 m above sea level, some less than 200 m. When one considers that the distance from the lowest parts of Bolivia to the Atlantic Ocean is about 2000 km via the Amazon or 1500 km via the Río de la Plata, the limited amount of topographic relief in much of eastern South America, from the Andean foothills to the ocean, is impressive. In Bolivia, this flatness, in combination with considerable rainfall, results in seasonal flooding of rivers and inundation of large tracts of forests.

The other third, the highlands in the southwest, rises abruptly from the lowlands and reaches to more than 6000 m in the cordilleras of the Andes. The eastern edge of the Andes is a relatively steep escarpment rising from 500 to more than 3000 m, at some places over distances of less than 100 km. At other places, it has been dissected by erosion to yield a series of ridges and valleys. As a result of this complex topography and prevailing and seasonal winds and precipitation, small areas as varied as perpetually humid

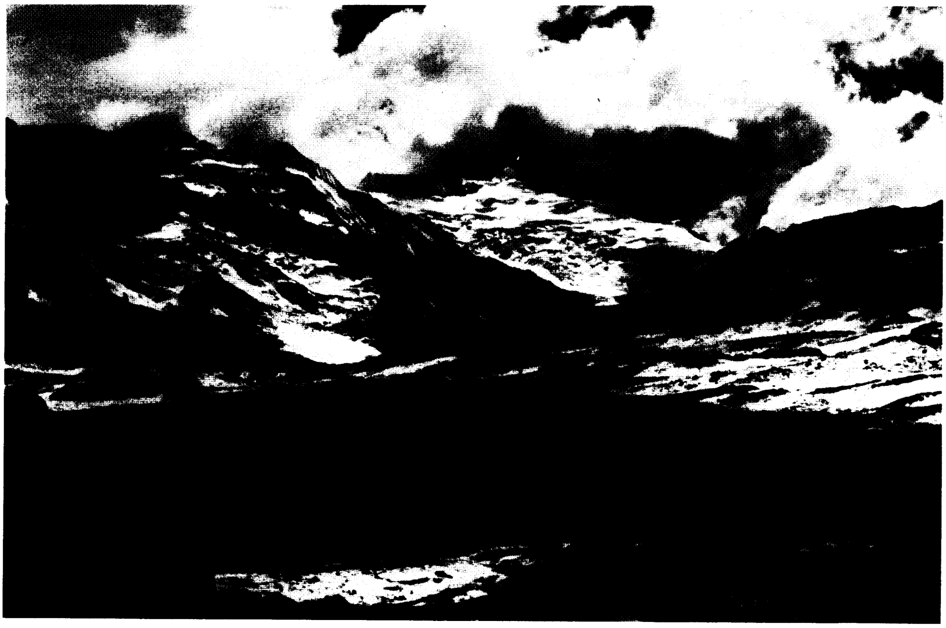


Fig. 453. Lake at divide on the road between Antequilla and Pelechuco (1448/6910), above elevation 5000 m, September 1980. Rocky habitat of *Chroeomys jelskii* and *Lagidium viscacia*.

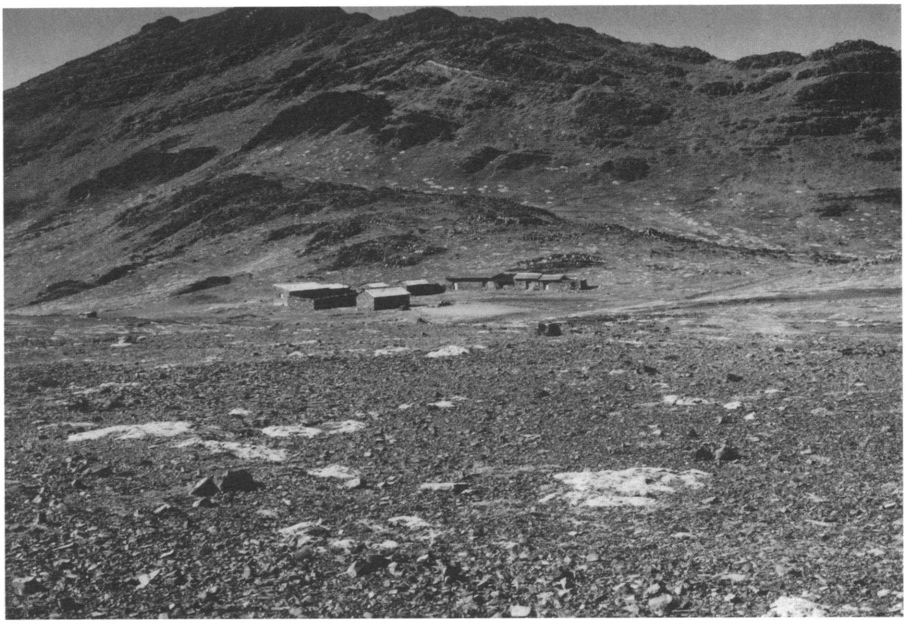


Fig. 454. Houses east of Antequilla (1452/6920), at elevation of about 4800 m, September 1982. Heavily grazed by alpacas, little vegetation evident. Habitat of *Auliscomys pictus*, *Auliscomys sublimis*, and *Calomys lepidus*.

cloud forests and dry valleys are intermingled in complex ways. In addition to the peaks of the cordilleras, the high country includes the relatively level altiplano. This area lies mostly in Bolivia but extends into Peru, Argentina, and Chile. In North American terms, the altiplano is roughly the size of the state of California and lies at about 13,000 ft elevation. The Altiplano is relatively dry, and aridity increases from north to south.

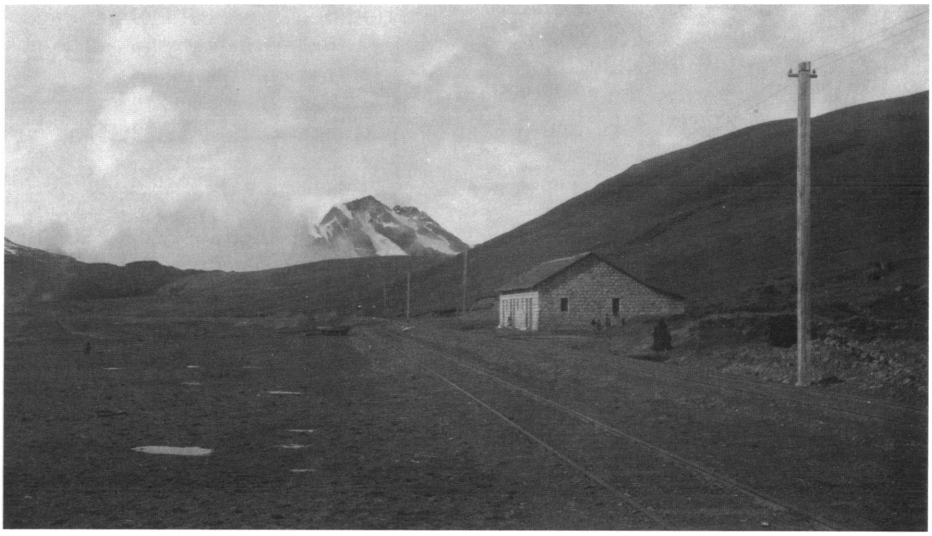


Fig. 455. Station at La Cumbre (1622/6803), elevation 4675 m. Photographed by Tate in 1926. Habitat of *Neotomys ebriosus*, three species of *Auliscomys*, and *Calomys lepidus*.

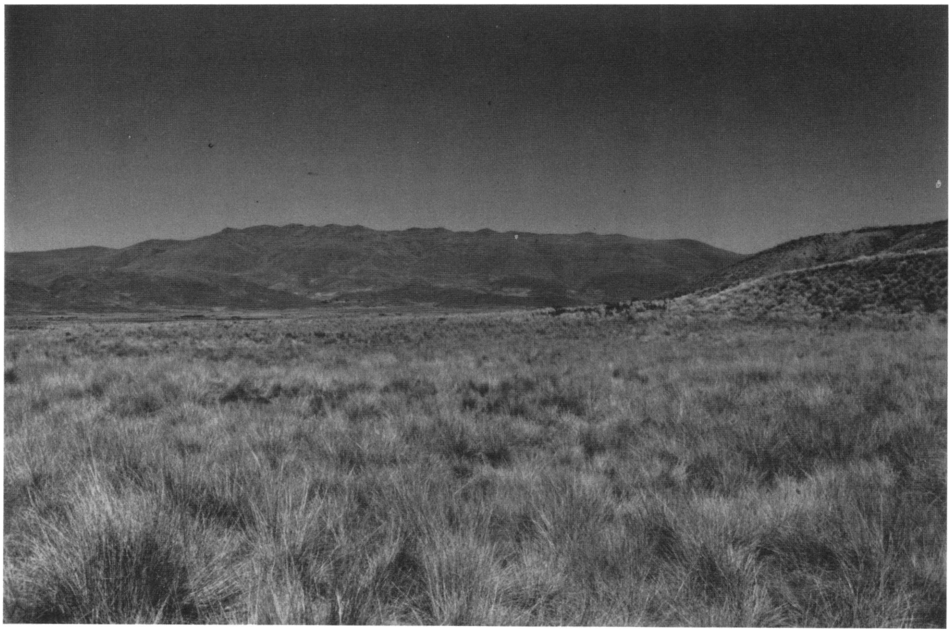


Fig. 456. Grassy vegetation in ungrazed area within the fence around the ruins at Tiwanacu (1633/6839), elevation 3840 m. Few ungrazed areas are to be seen on the Altiplano. We did not trap here but would expect to find *Akodon boliviensis* and *Calomys lepidus*.

CLIMATE

In the long sweep of geological history, major climatic changes have occurred. Current mammalian distributions largely reflect recent conditions and changes. A period of drought began rather abruptly about the year 1000 AD, at least in the highlands. This drought, documented from the study of ice cores from the Quelccaya ice cap in Peru and from sediment cores from Lake Titicaca, probably caused the collapse of the "politically integrated, expansive state society" of Tiwanaku (Ortloff and Kolata, 1993). We can surmise that fluctuations in aridity throughout the Pleistocene and earlier allowed the ranges of various species to expand or compelled them to contract, although few data are available to document former ranges. Even today our knowledge of the environmental conditions that may restrict the ranges of species now living in Bolivia is quite limited.

Average annual rainfall ranges from more than 3000 mm (3056 recorded as average over a 5-year period at Chimoré, elevation 300 m, Cochabamba) to less than 100 mm (51 recorded as average over a 14-year period at Chiguana, elevation 3684 m, Potosí) in the southern part of the Altiplano (Unzueta, 1975: 310, 312).

Mean annual temperatures in degrees Centigrade range from greater than 24° (24.2° in a period of 22 years at Cobija, Pando) to less than 7° (6.2° over 10 years at Penas, elevation 3986 m, La Paz).

VEGETATION

In figure 470, I have mapped six major vegetation zones (as did Salazar et al., in press; see further discussion of their work under Faunal Analysis below). Some other useful sources of vegetational and general ecological data are Holdridge et al. (1971), Unzueta (1975), UNESCO (1981), and Geyger and Arze (1982). The designation of six rather than a smaller or larger number of zones is arbitrary. No zone is uniform. Local conditions, such as the small wet areas or bogs on the Altiplano known as bofedales, are important to various mammals. Large parts of the lowlands, especially in the Beni, are subject to seasonal flooding (bosques de

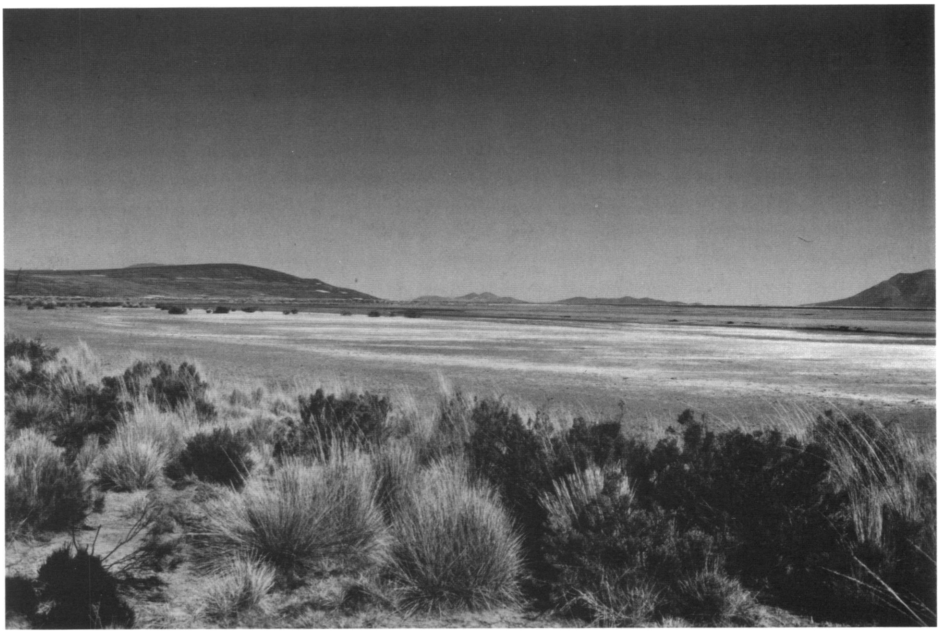


Fig. 457. Vegetation on bank of the río Desaguadero (1740/6732), about elevation of 3700 m, August 1984. Habitat of *Akodon albiventer*, *Phyllotis xanthopygus*, and *Oligoryzomys andinus*.

inundación). The limited number of areas with rocks and caves in the lowlands, may be the reason that bats of the family Mormoopidae are known only from the region near the Serranía Huanchaca. Fossorial mammals such as tuco-tucos favor areas with relatively deep and friable soils. These are just a few examples. Mostly, limiting factors for species have not been postulated except in the most general terms.

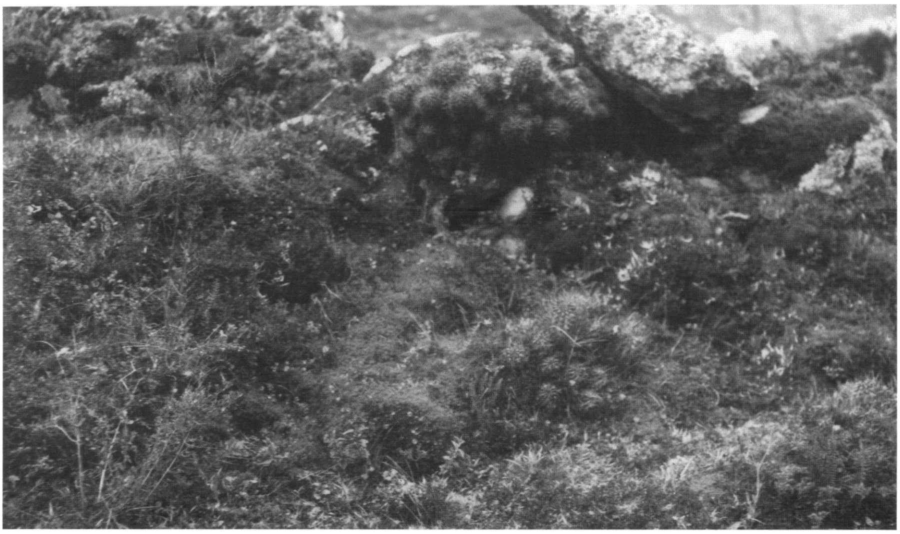


Fig. 458. Vegetation, including cactus, at Pongo (1620/6756) in the Unduavi Valley at elevation 3690 m. Photographed by Tate in 1926. Habitat of *Oligoryzomys* sp. B, *Akodon mimus*, *Chroeomys jelskii*, and *Auliscomys pictus*.

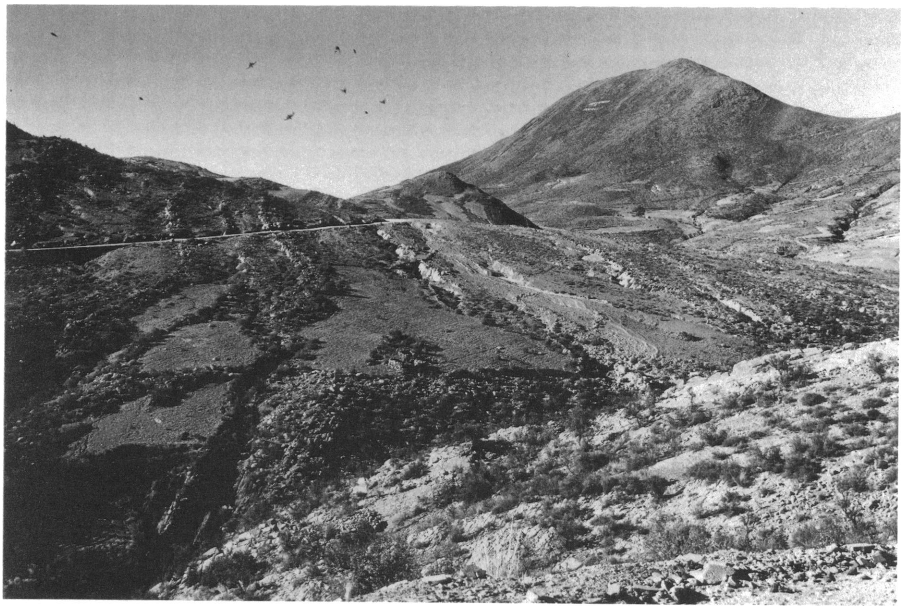


Fig. 459. Rocky hillsides and short scattered shrubs near Tarabuco (1910/6455), elevation ca. 3300 m, July 1983. Habitat of *Phyllotis xanthopygus*.

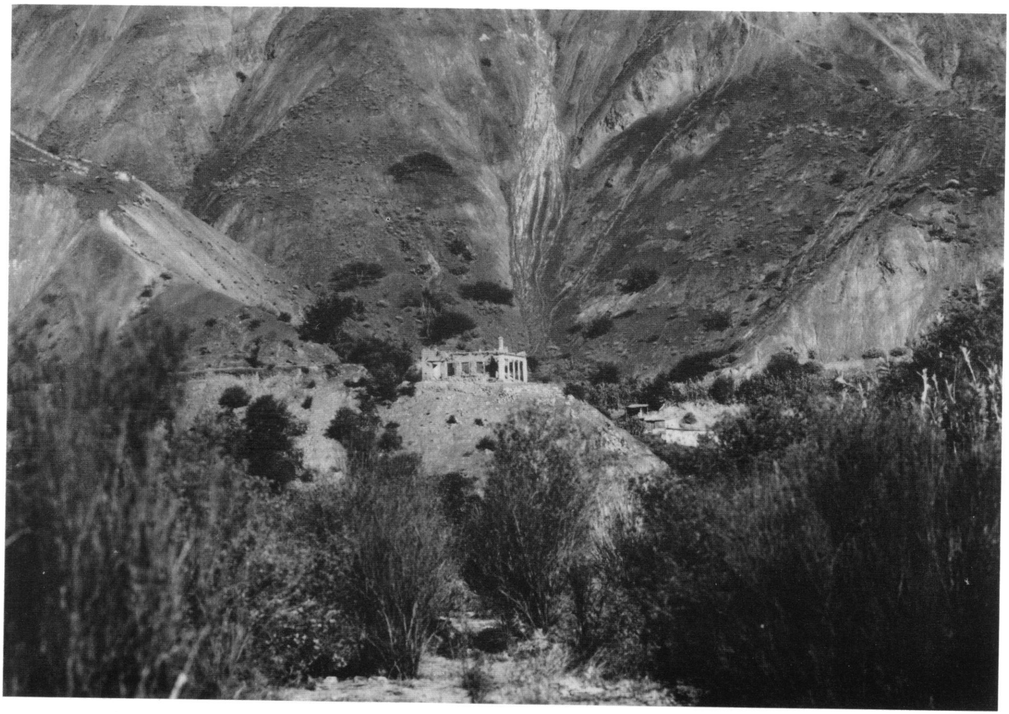


Fig. 460. View from the valley floor of the río Caracato (1659/6749), elevation 2900 m, April 1982. Habitat of *Octodontomys gliroides* on the arid hillsides and *Thylamys pallidior* on arid hillside and in marsh on valley floor. *Desmodus rotundus* was the only bat captured here.

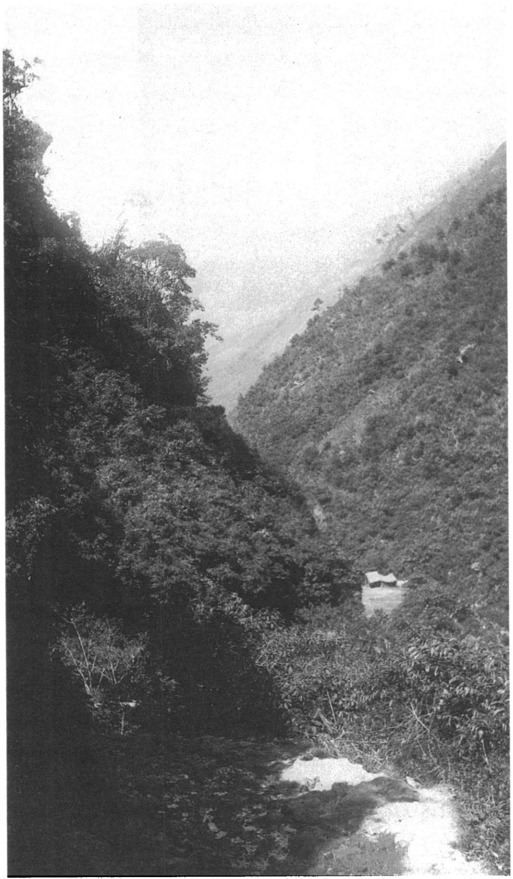


Fig. 461. Forested slopes at Ñequejahuira (1619/6752), elevation 2450 m. Photographed by Tate in 1926. Habitat of *Mustela frenata*, *Lenoxus apicalis*, *Oryzomys levipes*, *Thomasomys aureus*, and *Oxymycterus paramensis*.

1. **Altiplano** (and associated mountains and valleys). The predominant vegetation in this region is known as the puna.

> The *puna* is sunnier than the *páramos* [at high elevations in the northern Andes]; it also has a greater daily temperature range .... [A]bove 4,000 m there is a night frost on more than 300 nights a year. From 4,700 m, there are alternating nightly frost and daily thaw throughout the year. The ecoclimatic conditions are such that plant-growth is interrupted. Moreover, the length of the dry season, added to the cold, helps to limit the growth and development of plants whose adaptation to the very harsh ecoclimatic conditions can be seen in the biological types. This adaptation is of two morphological and anatomical types. They display a disproportionate development of underground organs, with a reduction or absence of stems, [the presence of] cushion forms, and leaf reduction accompanied by abundant pilosity, spinescence and succulence. Lastly, many woody plants of the *puna* are resinous, and are thus much sought after for fuel, which explains their destruction and rarity (UNESCO, 1981: 95).

The region as mapped in figure 470 includes the Andean plateau proper, the surrounding mountains (the Cordillera Occidental along the Chilean border and the Cordillera Oriental on the eastern side), which are devoid of vegetation on the snow-clad peaks, and various valleys. Most of the region is above 3000 m elevation. The few trees are mostly of introduced species of eucalyptus. A detailed study of vegetation in the vicinity of Ulla Ulla was published by Seibert (1993). Figures 453 to 459 are of localities above 3000 m elevation.

2. **Yungas**. These are the forested eastern slopes of the Andes mountains, which range in elevation roughly from 3000 to 500 m. "In the . . . Bolivian Andes, the forests of the east facies of the mountains . . . are known as the *ceja de la montana* .... [S]uch a range of altitude must contain several types of forest" (UNESCO, 1981: 92). The forest is mostly not deciduous. In the most humid areas there is a distinctive cloud-forest with tall ferns, deep humus on the forest floor, much moss, and trees festooned with epiphytes. These slopes are at places deeply dissected, and because of prevailing winds and resulting rainshadow effects, local areas within short distances may differ widely in aridity and in vegetation. Figures 460 to 465 are of localities in the yungas and valles. Figure 464 shows one of the more arid valleys.

3. **Tropical and Subtropical Forest** (Bosque Amazonico). The forests of the lower Yungas grade into the lowland (less than 500 m elevation) subtropical forests. The strictly tropical areas (i.e., where it never freezes) are in the northern part of the department of Pando. Here are the largest trees, the greatest number of species of trees, and the trees yielding rubber and Brazil nuts. The photograph in figure 467 was taken at 350 m elevation.

4. **Savannah** (Savana). These are open areas, largely grassland, with scattered trees or patches of forest (islas de bosque). In the southern part of the region, the forest exists in patches, as the dispersed vegetation phase. From south to north the amount of forest in-

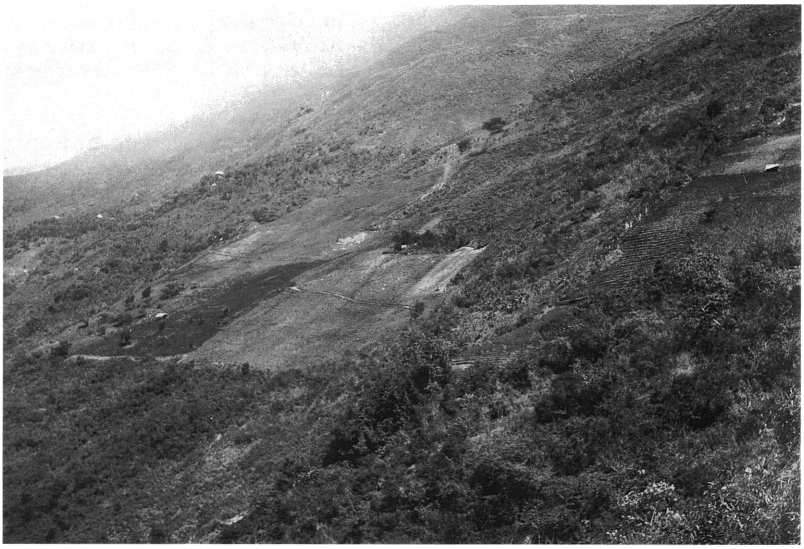


Fig. 462. Coca plantations on slopes at La Florida (1621/6746), elevation 1780 m. Photographed by Tate in 1926. Habitat of *Gracilinanus agilis*, *Marmosops dorothea*, *Akodon aerosus*, and *Rhipidomys couesi*.

creases until the grassland becomes the dispersed phase, remaining only in isolated patches known as pampas or chacos (e.g., Pampa de Heath near the Peruvian border and Pampa de Meio on the río Iténez, Chaco Lejo). Incidentally, the term "chaco" is used also for smaller clearings in forests. When most of the trees are palms, the term "Palm Savannah" is used. The ecology of the savannahs of Beni in the longer-term geologi-

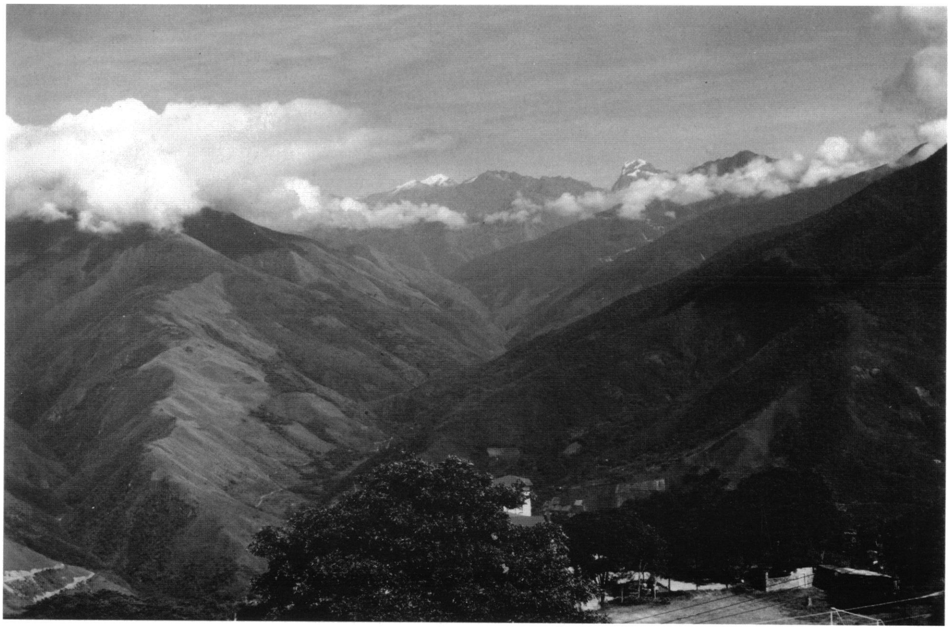


Fig. 463. View from Coroico (1610/6744), elevation 1715 m, May 1982. Forested or partly cleared slopes in the yungas of La Paz department.

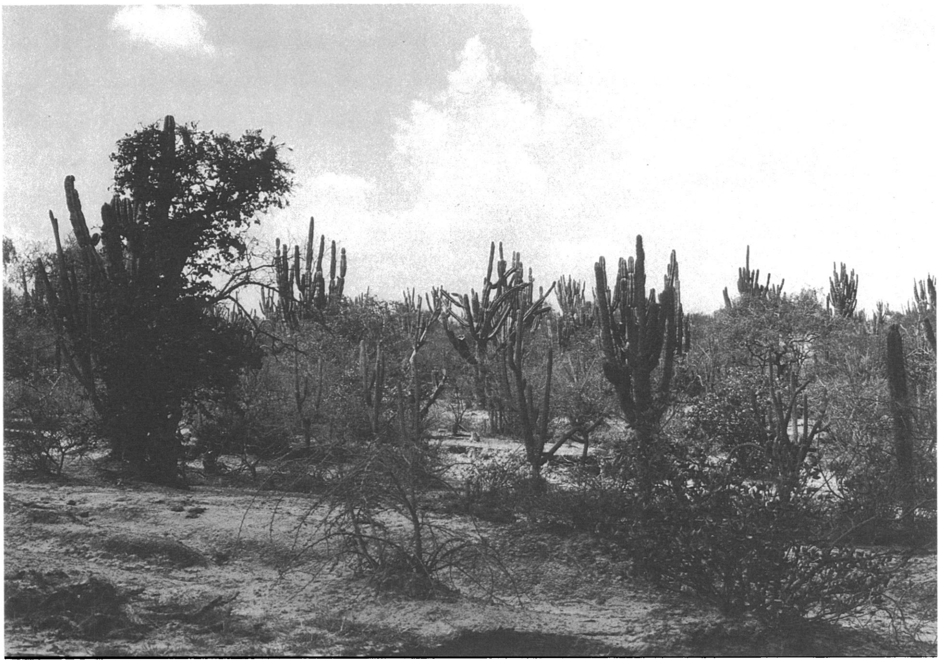


Fig. 464. Arid vegetation east of Comarapa (1758/6429), elevation 1700 m, September 1984. Habitat of *Graomys domorum*, *Promops nasutus*, *Anoura geoffroyi* (feed at flowers of cacti).

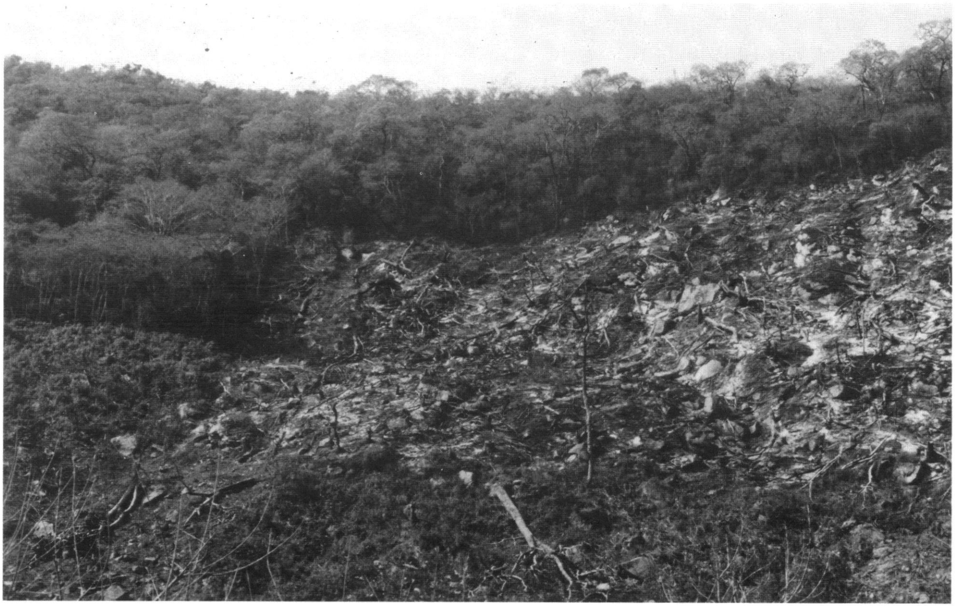


Fig. 465. Illustration of "cut and burn" agricultural practice commonly used in many parts of Bolivia, at about elevation 1000 m in Santa Cruz department, 1984, exact location not recorded.

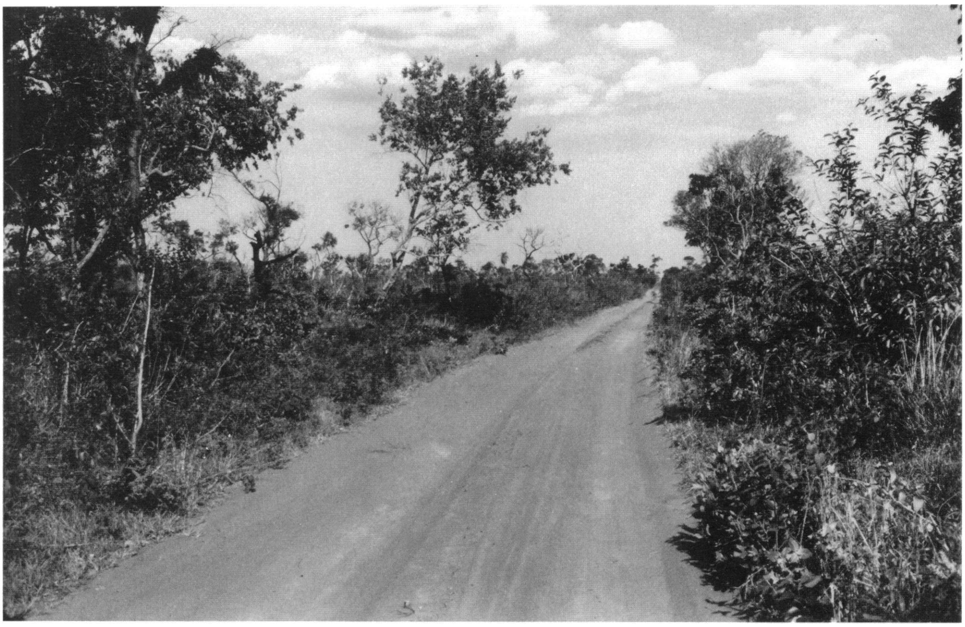


Fig. 466. Relatively arid area at the northern edge of the Gran Chaco on the road west of Roboré (1816/6007), elevation 475 m, October 1984. Habitat of *Ctenomys minutus*, *Thrichomys apereoides*, and *Chaetophractus vellerosus*.

cal context was analyzed by Hanagarth (1993).

5. **Subhumid Forest** (Bosque Chiquitano). This region is intermediate between the wet Amazonian forests to the north and the dry Chacoan forests to the south.

6. **Chaco**. The trees that are present in the Chaco are smaller and scrubbier than trees farther north. Figure 466 shows a Chacoan area west of Roboré.

Faunal Analysis

Species Densities: Six one-degree sample areas (A to F in fig. 470) were selected along a transect; tallies were made of numbers of species with ranges (as mapped for individual species in subsequent accounts) occurring in at least part of each quadrat. These numbers, plotted in figure 471, compare the species densities estimated among sample areas and among bats, rodents, and other mammals. The combined totals for all mammals and for each sample area are also shown. Clearly, for all groups, the Altiplano (area A) has a lower species density than other areas; this paucity is most extreme for bats. Rodents comprise 36% of all Bolivian species, bats about 31%, and species of all other orders combined 33%. Thus, the ratio of bats to rodents is about 1 to 1.2. However, the ratio of numbers of species of bats to numbers of rodents in one-degree sample areas D, E, and F is about 2.5 to 1. The reason for this reversal in relative abundance is that rodents, on the average, have smaller geographic ranges than do bats, a fact with implications discussed elsewhere (Anderson, 1991).

The relative abundances of individuals of different species in different places and at different times are additional biological dimensions scarcely touched upon here. Further study is needed.

A graph showing the cumulative number (decade by decade) of presently recognized living native species of mammals known by reported specimens from present-day Bolivia is shown in figure 472. By 1990, the number had reached about 300. Three projections (A, B, and C) beyond that date are shown. Additional species will be from three sources: those new to science, those already known from outside of Bolivia but newly discovered within Bolivia, and those already known and

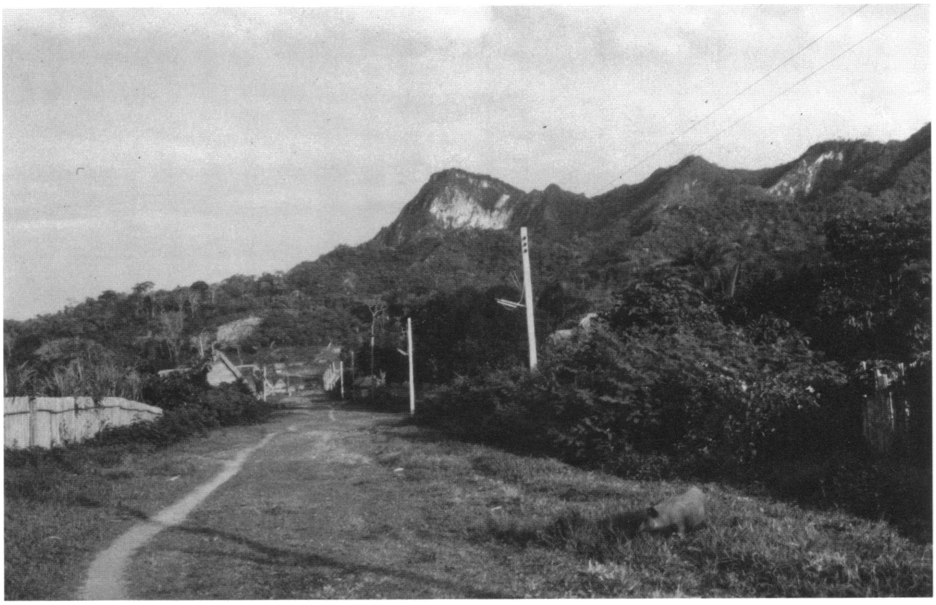


Fig. 467. Village of Rurrenabaque (1428/6734), elevation 350 m, September 1980. This is where the río Beni leaves the final foothills of the yungas. Habitat of *Akodon dayi.*

named but currently regarded as subspecies or synonyms. Taxonomic revisions that lump formerly recognized species and extinctions of Bolivian populations tend to reduce the number of recognized species living in Bolivia. The chinchilla (*Chinchilla chinchilla*) may now be extinct in Bolivia and the rate of extinction is likely to accelerate in the coming years. Within 20 or 30 years the rate of extinction may increase and the rate of discovery decrease enough to cause the known living Bolivian fauna to peak and begin to decline. Projections B and C are minimum and maximum estimates, while A shows an increase that was certain in 1991 because of specimens already in collections and taxonomic revisions that were underway. Experience through 1994 suggests that projection C is closer to reality than A or B.

About 78 species are presently on the hypothetical list. Some of these, although listed because of their proximity to Bolivia, probably will never be found in Bolivia. My own rough estimate is that about one-half of them will be found.

A published faunal list (Pacheco et al., 1993) for the Manu Biosphere Reserve—located some 150 to 200 km west of the Bolivian border in the drainage basin of the río Madre de Dios and its left-hand tributary, the río Manu, at elevations from 365 to 3450 m—provides interesting comparative data. Of the 190 species listed, 160 (or 84%) occur also in Bolivia. Only 30 do not, or at least they have not been found there yet.

Salazar et al. (in press) discussed the biogeography of Bolivian native mammals, using published data (Anderson, 1993) and unpublished data from my files. Their conclusions are of considerable interest.

The relative density of collecting efforts in different parts of the country was mapped by Salazar et al. (in press; see also fig. 473 in which all collecting localities are shown). Areas near cities and major roads and rivers are represented best. Although the data analyzed by Salazar et al. included records of more than 32,000 specimens in collections from hundreds of localities, 47% of the one-half-degree quadrats in the country were not represented by even one specimen.

In a symposium on the montane forests of Peru (Young and Valencia, 1992), great biodiversity (many species) and the occurrence of relatively small areas having high percentages of endemic species were noted for various taxonomic groups. According to Alwyn H. Gentry (p. 11), a single forested

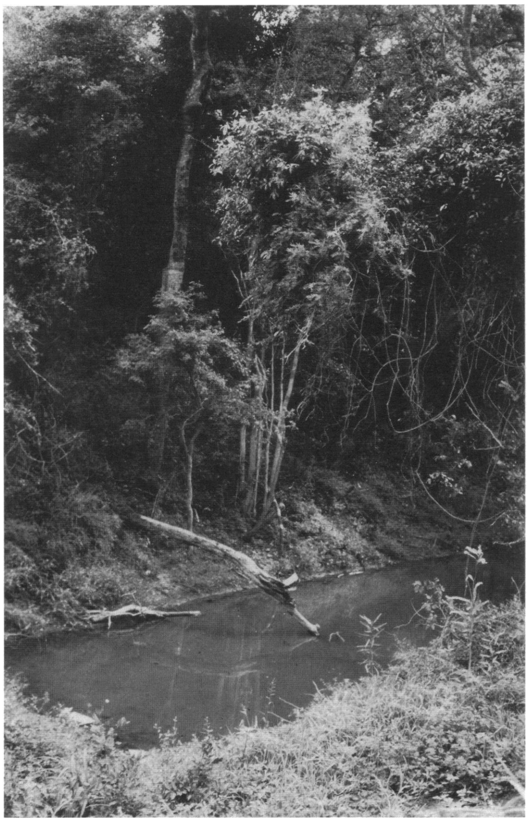


Fig. 468. At the edge of the Bañados del Izozog (1828/6207) in the dry season, elevation 290 m, October 1984. In the wet season, large areas are inundated. Seasonal inundation occurs in many parts of the lowlands. *Akodon toba* and *Calomys callosus* occur in grassy habitat nearby on slightly higher ground. *Panthera onca* occurs in the general area.

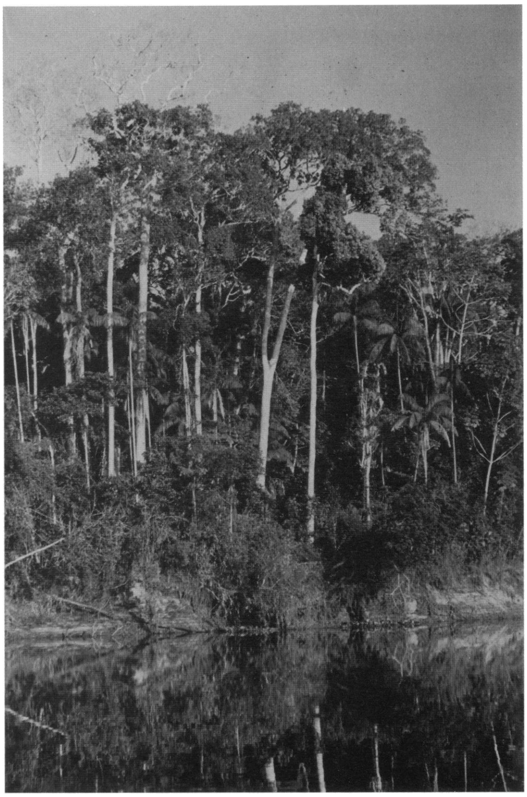


Fig. 469. Forest on bank of río Iténez between Ilha Floras and Larangeiras, Brazil, about elevation 200 m, 7 August 1964. The latter is at 1313/6209. Habitat of *Holochilus sciureus*, *Oryzomys capito*, and *Didelphis marsupialis*.

ridge (data from Ecuador but probably also true in Peru and Bolivia) can have as many as 100 locally endemic plants. Diana Silva (p. 34) noted that "very few" of the 750 species of spiders found at eight study sites in montane forests occurred at more than one site, and thus she postulated both small ranges and high local endemism. John P. O'Neill (p. 47) commented that more than 1700 species of birds are known from Peru, that over 55% of these occur above elevations of 1000 m, that 112 species are endemic to Peru, and that 106 of these have Andean distributions. Species density and endemism in Bolivian mammals are discussed below.

Biogeographic units are commonly analyzed and discussed by ecologists and other biologists. Many systems or schemes for defining, recognizing, and naming such units have been proposed. The history, technical details, and arguments for and against the systems need not concern us here. Vegetation is often the major basis for selecting such units. The selection process is somewhat subjective because conditions are not uniform throughout any given unit and the boundaries are not so sharp as neat lines on a map may suggest. Even if an unambiguous basis for defining units is formulated, data needed to apply the definition are limited in quantity and accuracy. Nonetheless, the process is informative in a general way.

Six major biogeographic units in Bolivia were delineated by Salazar et al. after considering both the areas used by earlier authors and the limitations of the methodology.

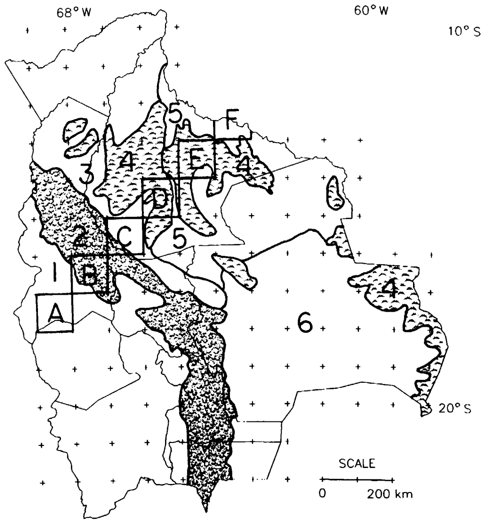


Fig. 470. Map of Bolivia showing six one-degree-square sample areas (A to F) along a transect from the high Altiplano to the Amazonian lowlands. Six major vegetation zones are: 1) the Altiplano and Interandean Valleys (Altiplano y Valles Interandinos); 2) Yungas (the forested slopes on the east side of the mountains); 3) Tropical Rain Forest (Bosque Amazonico); 4) Savannah (Savana); 5) Subhumid Forest (Bosques Chiquitanos); and 6) the Chaco (Ergueta and Salazar Bravo, 1991, and other sources). The species densities of groups of mammals in these sample areas are shown in figure 471.

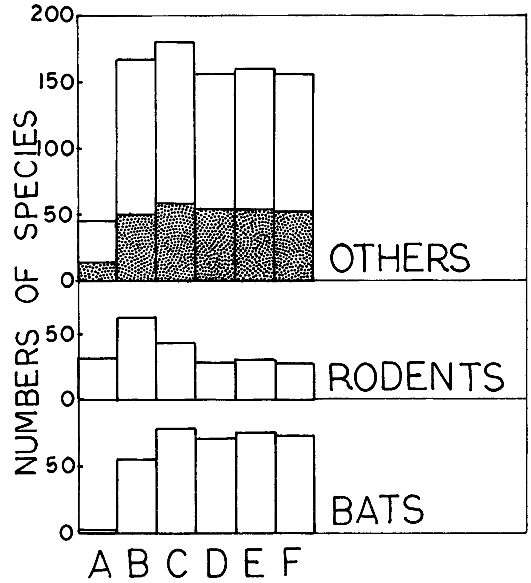


Fig. 471. Graph showing the numbers of species of bats, rodents, and other groups (stippled area within graph for all species at the top), and all mammals in the six sample areas shown in figure 470.

The units are listed and described above. The species occurring in each unit were tallied, and the numbers of species, numbers of endemic species, and degrees of similarity between the mammalian faunas of the units were compared. The relative sizes of average adult individuals of the species and their trophic roles in the six units were also discussed. Some differences in patterns between taxonomic groups, for example bats as compared to rodents, were also analyzed. Mammalian biogeography and Bolivian conservation were given special consideration. Excluding from the count humans and introduced species, 316 species of native mammals were known then from Bolivia. The numbers of species present in the six units were, respectively, 53, 114, 152, 114, 143, and 114. Thus, the Amazonian forest exhibits the greatest species diversity.

Sixteen recognized species were considered to be Bolivian endemics (i.e. confined to Bolivia). Certainly, some of these endemics will be found outside of Bolivia by further collecting or will be found by further taxonomic study to intergrade with some other species now recognized that occurs out-

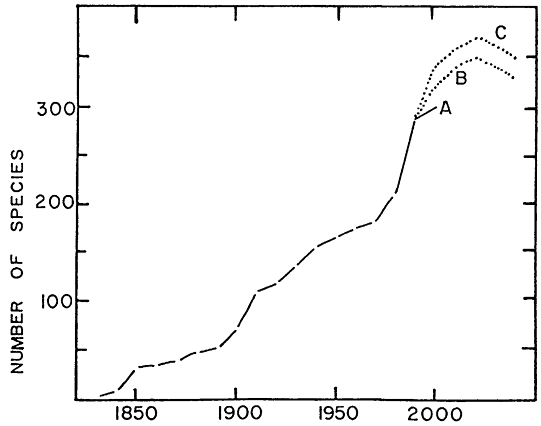


Fig. 472. Cumulative number of living species of native mammals known to inhabit Bolivia. A record of increasing knowledge. Values for future decades, predicted as discussed in text, are shown as A, B, and C.

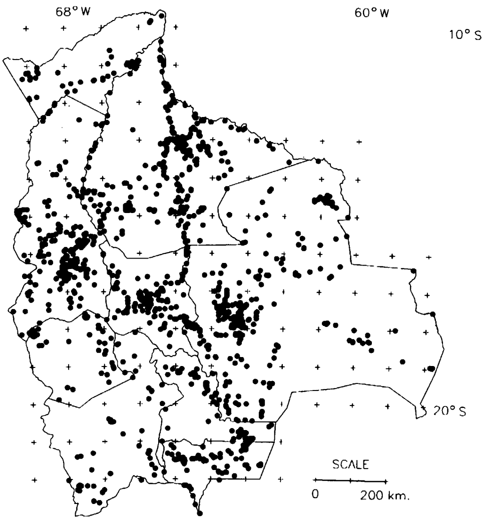


Fig. 473. Map showing all (1259) collecting localities for mammals. Separate maps were generated for bats, rodents, and other mammals. The only conspicuous difference in the pattern was that there are few localities for bats on the Altiplano. Otherwise, the same clusters of localities near major cities and along avenues of transportation, along rivers in the lowlands of northern Bolivia and major roads elsewhere, were evident on each map. This pattern is clear on the present map.

side of Bolivia. Although both of these processes tend to reduce the number and percentage of species that are thought to be Bolivian endemics, other processes tend to increase the number of endemics. Among these processes is the discovery of species new to science. Certainly more species await discovery, especially in the Yungas. Probably the percentage of endemic species within a given unit is highest for the Altiplano, followed by the Yungas. For a detailed discussion of the concept of endemism see Anderson (1994). I speculate that the net change in percentage of Bolivian species that are judged to be endemic to Bolivia will approach in the future a level of equilibrium slightly higher than that at present.

Before continuing the discussion of patterns in mammalian distributions, the nature of the basic data needs to be reviewed. Localities represented by specimens were plotted on a map for each species. Then I looked at the map, thought about what I knew about the animal (principally within Bolivia but also in surrounding regions) and about conditions within Bolivia, and drew a line or lines showing my estimate of the limit of the distribution within Bolivia for each species. In spite of the inherent subjectivity involved, I think that these estimates are about the best that can be made, until we learn more.

The confidence and the precision with which that line can be drawn depends on how much is known about (1) the actual occurrence of the species (i.e. the plotted localities), (2) the habitat requirements of each species, and (3) the habitats specifically available in each local area. Habitat requirements and local habitats are known, but only in a very general way. The fact that most species are known from few localities, as discussed elsewhere, means that even the "hard data" represented by dots on the maps are quite limited. The reader who wishes to discount my subjective boundaries has the dots to contemplate. In addition to the inherent subjectivity in estimating boundaries, there is potential circularity in reasoning about patterns. If a species is known only from localities in the Gran Chaco, and I know roughly where the limits of the chacoan habitat are, I may draw the estimated boundary for that species near the habitat limits. To contend that there is a suite of chacoan species that have common limits then tends to be redundant or the reasoning a bit circular.

Alternatively, a more objective procedure might be considered. Suppose that for each species map a convex polygon is drawn around the existing dots and a procedure for extralimital data is incorporated. Then, another polygon is drawn outside the first, with the distance between the two polygons equal to the average distance between the dots. The outer polygon becomes the "objective" estimate of the boundary for each species. I postulate that the general patterns of distributions that are evident in the more subjective analyses would remain.

To obtain a visual summary of distributional limits within Bolivia for each of three groups of mammals (bats, rodents, and others), all limits estimated for the individual species were superimposed on one map for each group (figs. 474 to 476). Areas of relatively rapid faunal change are indicated by

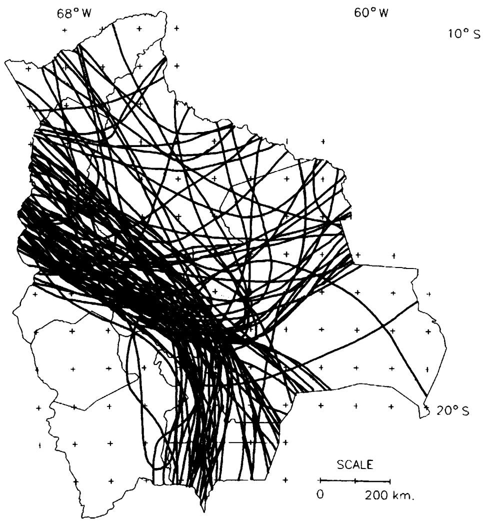


Fig. 474. Map of Bolivia with the boundaries of the geographic ranges of all species of bats superimposed. Any clustering of boundaries is evidence of relatively rapid faunal change.

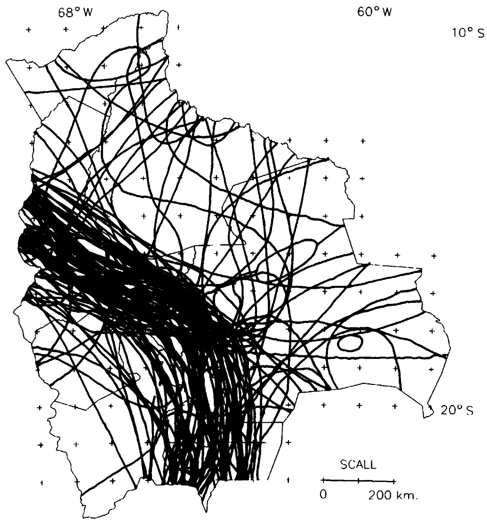


Fig. 475. Map of Bolivia with the boundaries of the geographic ranges of all species of rodents superimposed.

the clustering of boundary lines. Most boundaries for all three groups cluster in a broad band around the eastern slopes of the Andes, an area known as the Yungas and Valles. As noted elsewhere, this area is not simply a location where lowland and highland species reach their respective southwestern and northeastern limits. Inspection of the maps for individual species reveals that many species are confined to the Yungas and Valles area. Conversely, for example, the maps reveal few species of bats and few boundaries on the Altiplano.

This approach to analysis of faunal areas uses animal distributions to reveal patterns. In a way, this is the reciprocal of another common approach (as used by Salazar et al., in press; and many other authors) in which areas are first defined and delineated by vegetation, topography, and precipitation, or on the basis of other environmental parameters. Then the distribution of mammalian fauna (or whatever other part of the total fauna is of interest) is compared to these previously defined areas to determine which are more and which are less similar.

An additional approach to the study of distributional areas (areography) was used by Armstrong et al. (1986) in an analysis of the mammalian fauna of the Plains states in North America. Four suites of species with more or less common patterns of distribution were plotted, each suite on a separate map. For Bolivia, I adopted this approach by creating four separate maps. In figure 477, I plotted all of the species that occur in the

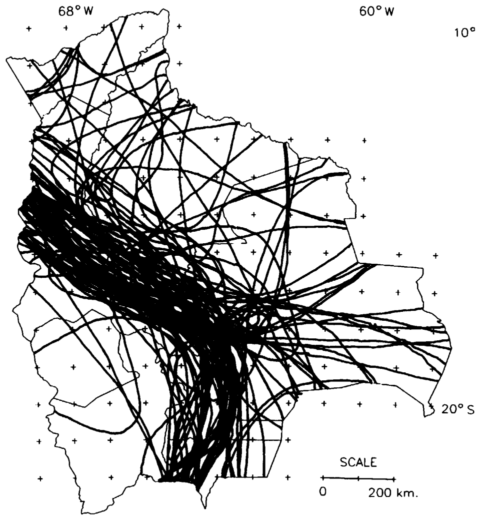


Fig. 476. Map of Bolivia with the boundaries of the geographic ranges of all species of mammals other than bats and rodents superimposed.

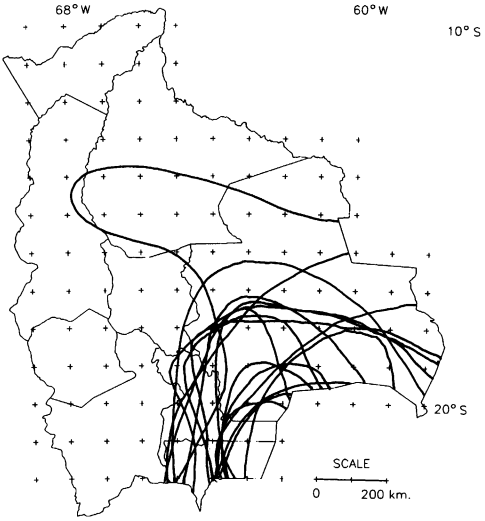


Fig. 477. Map of Bolivia with the boundaries of the Chaco suite of species superimposed.

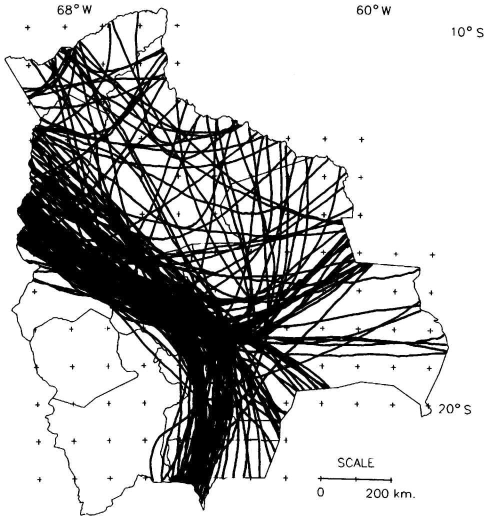


Fig. 479. Map of Bolivia with the boundaries of the Amazonian suite of species superimposed.

Gran Chaco southeast of Bolivia and that reach their northern limits within Bolivia. All of the species that occur on and that reach their limits on the Altiplano or near its eastern edge are shown in figure 478. Species that occur in the Amazonian region north of Bolivia and that reach southern or southwestern limits in Bolivia are shown in figure 479. Finally, species which, within Bolivia, are more or less confined to the Yungas and Valles area are shown in figure 480. No suite of species was discernible for either of the other two types of areas delineated in figure 471 and used by Salazar et al. (in press), namely the Savannah and Chiquito Forest. The species occurring in these areas almost invariably occur also in other areas. The lines for approximately 50 of the 136 species in

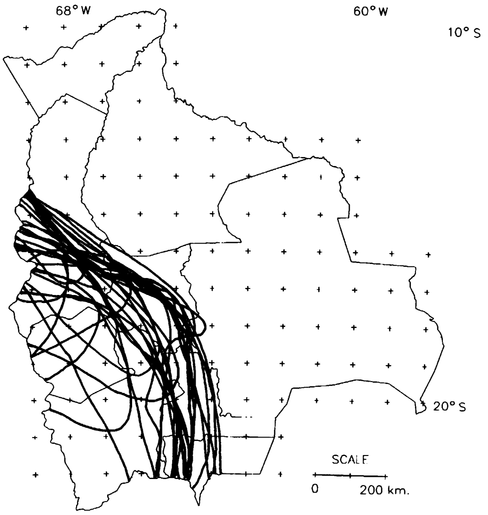


Fig. 478. Map of Bolivia with the boundaries of the Altiplano suite of species superimposed.

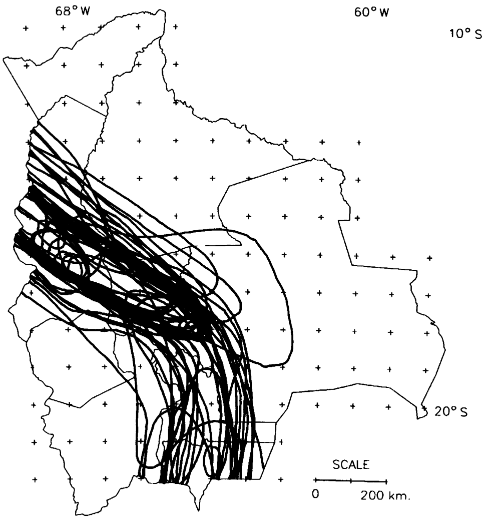


Fig. 480. Map of Bolivia with the boundaries of the Yungas suite of species superimposed.

the Amazonian suite cross the border into Argentina or Paraguay to the south and thus indicate that the ranges of these species extend south of Bolivia. About 20 Amazonian species reach their southern limit near the edge of the Gran Chaco. The general pattern for the Amazonian suite is a gradual dropping out of species as one leaves the tropical Amazonian high forest in the north, passes through progressively cooler and drier Savannah and Chiquito Forest, and finally enters the thorn scrub of the Chaco.

The numbers of each mammalian order that either do or do not fit one of these four selected patterns are given in table 1. Most species (226 of 296 species analyzed, or 76%) can be reasonably assigned to one of the patterns. A few poorly known species were excluded from this analysis because it was not reasonable to say whether they conformed to any of the patterns. Bats and primates are principally Amazonian. Rodents have a much higher proportion of species in the Chaco, the Altiplano, and the Yungas and Valles than in other areas. Almost half of the species of Carnivora do not easily fit any one of the four patterns.

MANAGEMENT AND CONSERVATION

Some interactions between native mammals and people have been noted briefly in various accounts of species. Among interactions that may be regarded negatively from the human point of view are the transmittance of organisms that cause disease in humans or in domestic mammals; damage to crops; damage to buildings, ditches, or other human facilities; and the killing of domestic animals or even humans on rare occasions.

In relation to disease, the role of *Calomys callosus* as a host of the Machupo virus has been mentioned. Certainly other mammals act as hosts to other organisms or viruses that can produce disease in humans, such as yellow fever, leishmaniasis, and plague, but little specific information has been obtained. The vampire bat, *Desmodus rotundus*, has been known to transmit to cattle the virus that causes rabies, and rabies can occur in other species of mammals, including humans.

Various small rodents, especially the introduced house mouse and rat, *Mus musculus* and *Rattus rattus*, are known to damage crops both in the field and in storage after harvest.

Reports of predators killing domestic animals are only anecdotal. Certainly large predators such as the jaguar (*Panthera onca*), the puma (*Felis concolor*), and the spectacled bear or jucumari (*Tremarctos ornatus*) do sometimes kill domestic animals. The smaller cats and the foxes may take chickens or other small domestic animals. Although we know such predation occurs, we have no quantitative data to use in its evaluation.

Other interactions are regarded as beneficial. Among these are the use of wild mammals as food, use of skins for their fur or for leather, and the recreational or tourist values of sport hunting, nature photography, or wildlife watching.

The larger rodents, including the capybara (*Hydrochaeris hydrochaeris*), the hochi pintado (*Agouti paca*), and the hochi colorado (*Dasyprocta punctata*), are commonly hunted in rural lowland areas. The larger primates, *Alouatta*, *Ateles*, and *Cebus*, are likewise hunted for food and, where hunted intensively, populations have been reduced or eliminated. The peccaries (*Tayassu pecari* and *T. tajacu*) are widely hunted for both food and their skins. Two species of small deer of the genus *Mazama* (*M. americana* and *M. gouazoupira*) are relatively abundant and are favorite sources of food in the lowlands.

The tendency, illustrated above, to classify animals or their actions as either good or bad on some particular human scale is generally naive from a broader biological or philosophical perspective. Firstly, a given action may be good, bad, or neutral, depending on circumstances and the perspective from which it is viewed. Secondly, we do not know enough about the current status of most species or their complex ecological relationships to evaluate their actions effectively. Thirdly, human societies, not only in "developing" countries but everywhere, have not yet learned how to balance short-term and long-term values, how to equitably and productively allocate costs and benefits, or how to achieve and maintain a sustainable life-style, civilization, or ecosystem. In fact, it is not generally agreed that it is possible to do these things or even desirable to try.

The human population in Bolivia has about doubled since I first worked there in 1963, and current trends, if continued, will double the population again in the next 30 years. Clearly this will affect wildlife, although in what ways exactly is not so clear. No one is closely monitoring changes in populations of most of the native species of mammals. Only for the vicuña, *Lama vicugna*, are some general data available. This species has been protected in special areas, has survived, and in fact has increased from the low level reached several decades ago. The chinchilla, *Chinchilla chinchilla*, probably was exterminated in Bolivia by 1963. The guanacoe, *Lama guanicoe*, is known to have survived only in one local area at the edge of the Gran Chaco and may soon become extinct there. The white-tailed deer, *Odocoileus virginianus*, was recorded in 1974 in the vicinity of Pelechuco, but no current information on its status is known to me. The pampa deer (*Odocoileus bezoarticus*) and the other large deer (the marsh deer, *O. dichotomus*) have probably been reduced in range and in numbers by hunting, but no specific or current information is available. The taruca (*Hippocamelus antisensis*) of the high Andes may be subject to overhunting; again, no data are available. The Chacoan peccary (*Catagonus wagneri*) is at risk; its population is probably declining throughout its range and overhunting could eliminate it from the Bolivian fauna.

Conservationists' attention has turned to the importance of general biodiversity, rather than focusing only on the risks that a few charismatic megavertebrates face (Scott et al., 1987). Increasing knowledge is raising Bolivia's rank among countries exhibiting megadiversity (Yensen et al., 1994); however, rank is a tentative thing considering our ignorance about the faunas of many nations. The future for native mammals in Bolivia will be decided by Bolivians. Mammals are just one small part of the larger natural system. For a general review of the state of the environment and related problems see Freeman et al. (1980) and E. Geyger and C. Arze (eds., 1982). More Bolivians are aware of conservation problems now than a few years ago, and I wish them well. They can use whatever international help they are offered. I hope that they will do better than what was done historically in North America. Here the bison was nearly exterminated and the passenger pigeon and Carolina parakeet were exterminated before effective conservation efforts were begun (see Shaw and Schmidly, 1994). I have merely outlined the broadest view of the subject of conservation and have not suggested specifics, which would be beyond the scope of the present work. The present summary of the mammalian fauna and the distribution of its species provides a basic, but general, picture of an incredibly diverse fauna and may help in future planning for its conservation.

ABBREVIATIONS AND ACRONYMS

Some of the standard abbreviations for collections (Yates et al., 1987) are shortened further here to save space and costs because they are cited hundreds or thousands of times in lists of specimens, e.g., AMNH for the American Museum of Natural History is shortened to AM in lists.

ACB	Atlas Censal de Bolivia, 1982
AMNH or AM	American Museum of Natural History, New York
ANSP	Academy of Natural Sciences, Philadelphia
BM	British Museum (Natural History), London
BZM	Berlin, Zoologisches Museum, Humbolt Universitat
CAS	California Academy of Sciences, San Francisco
CBF	Colección Boliviana de Fauna, La Paz, formerly in IE and MNLP
CDC	Centro de Datos para la Conservación, La Paz
CENETROP	Centro Nacional por Enfermedades Tropicales, Santa Cruz
CITES	Convention on International Trade in Endangered Species
CMNH or CM	Carnegie Museum of Natural

	History, Pittsburgh, Pennsylvania
CNHM	Chicago Natural History Museum
EBB	Estación Biológica del Beni
EBD	Estación Biológica Doñana, Sevilla, Spain
ENDE	Empresa Nacional de Energía
ENTEL	Empresa Nacional de Telefónico
FMNH or FM	Field Museum of Natural History, Chicago
GEOBOL	Servicio Geologico de Bolivia
GPS	Global Positioning System (satellite electronics)
IBBA	Instituto Boliviano de Biología Altura, La Paz
ICZN	International Code of Zoological Nomenclature
IE	Instituto de Ecología, La Paz
IGM	Instituto Geográfico Militar, Mapa de la República de Bolivia (1:3,000,000); IGM5, 1: 500,000 maps
IML	Instituto Miguel Lillo, Tucumán
IUCN	International Union for Conservation of Nature
LACM	Los Angeles County Museum
LSUMZ or LSU	Louisiana State University Museum of Zoology, Baton Rouge
MACN	Museo Argentino de Ciencias Naturales, Buenos Aires
MAPA	Mapa de la República de Bolivia (1:1,500,000), 1947, by R. R. Camacho Lara, Zumelza y Cia., La Paz; or, Mapa de la República de Bolivia (1: 1,000,000), 1980, third edition, Instituto Geográfico Militar, La Paz.
MARU	Middle America Research Unit (now closed), Balboa Heights, Canal Zone, Panama
MCN	Museo Nacional de Cienciàs Naturales, Madrid
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts
MHA	Map of Hispanic America (1: 1,000,000), American Geographical Society, New York (on one of the nine sheets covering Bolivia)
MLP	Mapa del Departamento de La Paz, 1:500,000, 1981
MNK	Museo de Historia Natural "Noel Kempff Mercado," Santa Cruz
MNLP	Museo Nacional de Historia Natural, La Paz
MSB	Museum of Southwestern Biology, Albuquerque
MSU	Michigan State University, East Lansing
MVZ	Museum of Vertebrate Zoology, Berkeley
N.L.	Not located
ONC	Operational Navigational Chart (1:1,000,000), Aeronautical Chart and Information Center, U.S. Air Force, St. Louis, Mo. (reference to either sheet ONC N-26, revised 1967, or to sheet ONC P-26, 1965). Referred to as WAC (World Aeronautical Chart) in field journals of AMNH 1963, etc.
PASB	Pan American Sanitary Bureau
PRBN	Proyecto Ríos Blanco y Negro
RAP	Rapid Assessment Program, Conservation International, Washington, D.C.
RON	Território de Rondônia (1: 1,000,000), Instituto Brasileiro de Geografia e Estatítica, Divisão de Cartografia, 1961
SNCFHB	Servicio Nacional de Control de Fiebre Hemorragia Boliviana
TIPNIS	Territorio Indigena Nacional Isiboro-Sécure
UAF	University of Alaska, Fairbanks
UAGRM	Universidad Autonoma "Gabriel René Moreno," Santa Cruz
UCD	University of California at Davis
UCONN	University of Connecticut
UMMZ	University of Michigan Museum of Zoology, Ann Arbor
UMSA	Universidad Mayor de San Andres, La Paz
UNM	University of New Mexico, Albuquerque
USBGN	U.S. Board of Geographic Names, Dept. of the Interior, Washington, D.C. (Gazetteer No. 4, Bolivia, 1955)
USNM or US	United States National Museum, now the National Muse-

	um of Natural History, Washington, D.C.
WAC	World Aeronautical Chart, see Operational Navigational Chart
ZFMK	Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn
1618 /6753	etc., this example is for 16°18′ south latitude and 67°53′ west longitude. The coordinates of rivers are given for their mouths, unless otherwise noted.

MAMMALOGICAL GAZETTEER OF BOLIVIA

Paynter et al. (1975) published an ornithological gazetteer of Bolivia after which the following gazetteer is patterned. Because many collectors obtained both birds and mammals, there is some overlap. References to all type localities for Recent Mammalia in Bolivia are included here.

The intent here is to document every locality from which a specimen of Recent mammal has been preserved in a museum collection. A few localities referred to in the literature but not represented by specimens are also included. The original version of January 1980 was compiled with the help of Ted Danforth, Jr., and was based on the literature and on specimens in the American Museum of Natural History. Other localities represented in this and other collections and localities visited since 1979 have been added as I have had opportunity to obtain this information.

By using this alphabetical list in conjunction with the "List of Collectors" and the chronological "History of Collecting," locations of origin of specimens can usually be resolved. Since more than one place may have the same name, it is necessary to know collector and date to be certain. The adequacy of maps available to collectors through the years and the care used by collectors in ascertaining and designating localities have varied; therefore, some imprecision and some inaccuracy persist.

For each locality, the name is followed by the name of the department (or country, if outside Bolivia). The latitude and longitude are then given (abbreviated as noted in list of abbreviations), along with the map or other source of those coordinates. Then, listed in chronological order are names of collectors, dates, and names of authors (with dates of publications in parentheses), notes on type localities, and variant spellings that have been used. Variant spellings may be found on different maps published within Bolivia and in the absence of an official arbiter I do not indicate which is correct. Occasionally there is a clear misspelling, but even if there is one correct spelling, it is useful to know the variants that appear on specimen labels or in the published literature. For rivers, the coordinates are for the mouths, unless otherwise indicated. Collections often have been made at one or more places designated as being some distance from the named reference locality rather than at that locality. Coordinates are given for each actual source of specimens. Coordinates not followed by a map source in parentheses were estimated in some way by me and are sometimes less accurate than those from maps. For example, a site designated as "20 km SE by road" might be estimated to be 15 km SE in a straight line and coordinates calculated accordingly. Different maps may also show somewhat different coordinates for a named place.

Cross-references are provided when some specimens have one designation and others from the same place have a different designation on specimen labels or in published reports.

In some cases, the province as well as the larger department is given. This is done because some original labels show both province name and local place name and these names have been confused in museum records or in publications. Consulting the gazetteer should help reduce this confusion. Otherwise, provincial names have not been inserted. Recently, Bolivian collectors have included province names in designating localities more often than collectors did in earlier years.

The sequence of localities is alphabetical in conventional English form, thus Ll, Ñ, and Ch, used in Spanish as letters different from L, N, and C and placed in Spanish dictionaries after all entries for those letters, are not separated here. Locality designations are sometimes complex, e.g., a locality is designated in two different ways, and one is cited one time and the other at other times. Some designations begin with an article such as el or las or with a general term such as río, serranía, or laguna. For the convenience of readers these are cited under the specific term rather than under the general term and many of these are cross-referenced.

LIST OF LOCALITIES

ABAIXO DA LANTERNA, Brazil N.L.

On rio Guaporé, probably on the Brazilian side, Natterer (Pelzeln, 1883: 94).

ABAPO; Santa Cruz 1850/6328 (USBGN)

Pine (specimen from Gene Harris of Santa Cruz), Aug. 1980, from 3 km N of (and 7 km S of rio Grande; 1848/6328).

ABRA, LA; Santa Cruz 1722/6302

Hibbs, Aug. 1965, 18 km NE of Warnes; and 2 km N of La Abra (1721/6302).

ABUÑA; Pando 0942/6523

Felis pardalis (L. Salles, personal commun.); RAP team, June and July 1992, Puesto Abuña (0947/6532), 140 m, Bolivian naval post on S bank of río Abuña in Provincia General Federico Roman, opposite Fortaleza, Brasil; same RAP team, "Cachuela Camp" on N bank of río Abuña at first cachuela about 3 km upstream from Puesto Abuña (0945/6533); on some maps as Abuna or Abunã.

ACACIO; Potosí 1800/6605

Kessler, Aug. 1991, 31 km from, on road to Uncia (1806/6608).

ACAPULCO, *see* San Joaquín.

ACERAMARCA, RÍO, *see* Aceromarca.

ACEROMARCA, RÍO; La Paz 1618/6753 (USBGN)

Tate, May 1926, 3275 m, tributary to río Unduavi, Beni drainage. "The stream in the great glaciated valley that is visible directly across the Unduavi valley from the point of rails at Ichuloma. Camp half an hour up valley where the projected railbed crosses the stream." Creighton, Nov. 1979, 2600 m, 1 km S of Yerbani. Anthony (1926, pl. 1), type locality of *Thomasomys ladewi*; Tate (1931b: 12), type locality of *Marmosa aceramarcae* (= *Gracilinanus aceramarcae*); AMNH-MSB party, Aug. 1992, 2990 m, (1619/6753 GPS); see also Yerbani. "Cabezilla de" *Hippocamelus antisensis*, obtained by Jorge Condori, Apr. 1992 (1618/6753). AMNH-MSB party, Aug. 1992, 2990 m (1619/6753); CBF party, Sept. 1992, 2080 (1619/6753).

ACHACACHI; La Paz 1603/6843 (USBGN)

Simons, Oct. 1900, Feb. 1901, 3827 m, SE of Titicaca; Thomas (1911b: 256), as Achacoche; Gilmore, Nov. 1942, 5 km W of (1603/6846), 15 km N of (1555/6843), and Hacienda Poccata (or Pocoata) to the north (ca. 1600/6845), in province of Omasuyos; Baudoin, May 1968, 10 km E of (1603/6838); also spelled Achacach.

ACHACHAIRU; Beni 1324/6404 (MARU)

Webb, 20 Apr. 1970, on río Itonamas.

ACHACHICOLA; La Paz 1621/6803 (ACB)

Pacheco, 1980s, 2 km NE of Alto Achachicola, sometimes spelled Achachicala.

ACHIRI; La Paz 1712/6900

Alvarado, June 1989, in province of Pacajes.

ACHOCALLA; La Paz 1634/6810 (ACB)

Mercado, 1987.

ACRE, PUERTO; Beni 1219/6428 (RON)

AMNH, July 1964.

AGUADULCE, *see* San Joaquín.

AGUA DULCE; Pando 1101/6612

AMNH-MSB party, July 1986; 160 m.

AGUA HEDIONDA; Santa Cruz 1810/6344

de la Barrera, Nov. 1954, 1955 (Fonseca, 1959; Hopkins and Rothschild, 1966: 120); also see Florida and Floripondio.

AGUAIRENDA MISSION; Tarija 2151/6340 (USBGN)

ca. 850 m, (MHA); Thomas (1898b).

AGUA RICA; Oruro 1820/6836

An estancia, 40 km E and 22 km S of the village of Sajama; AMNH-MSB party, Sept. 1986, 3850 m.

AGUIRRE N.L.

F. B. Steinbach, Mar. 1940.

AIQUILE; Cochabamba 1807/6509 (USBGN)

F. B. Steinbach, July 1936; de la Barrera, 2225 m, Sept. 1955 (Fonseca, 1959: 130); also spelled Aiguile or Aquile.

ALALAY, LAGUNA; Cochabamba 1725/6609

EBD party, Sept. 1982, or Alalai, at S side of city of Cochabamba.

ALASKA MINE; La Paz 1617/6802 (Tate field map)

Tate, Mar. 1926; "A . . . tin mine lying at the head of a glaciated valley immediately to the north of and above Pongo" (1620/6757, USBGN), ca. 4300 m.

ALCOCHE; La Paz 1542/6740 (USBGN)
MARU, 1963; Creighton, May 1978, 4 km (by road) NW of (1540/6742) 1400 ft (= 425 m); cited as Aleoche by Pine (1972: 22).

ALEJANDRIA; Beni 1205/6509 (IGM)
AMNH, May 1965, on río Mamoré, 5 km NW of, on left bank (1203/6510).

ALISUNI; Cochabamba 1646/6637 (MAPA as Alisani)
Simons, July 1901; Thomas (1902a), 2600 m, "on the high páramos north and northwest of Cochabamba."

ALMACEN, PUERTO; Beni 1447/6451 (MAPA)
Pilleri (1969b), on río Ibare west of Trinidad; Anderson, Aug. 1983, 230 m.

ALMACEN, PUERTO; Santa Cruz 1530/6225
EBD party, 1986; Pajuelo, Jan. 1988; Tapia, Dec. 1989, on río Negro in province of Ñuflo de Chávez.

ALOTA; Potosí
Salazar, May 1989, 3 km NE of (2118/6720).

ALOTA, VILLA; Potosí 2124/6741
EBD party, Nov. 1982; 2 km N of (2123/6741); 2 km W of (2124/6741); 9 km W of (2124/6747).

ALTAMACHI; Cochabamba 1702/6626 (USBGN)
Gilmore, Mar. 1943.

ALTIPLANO; this, like other terms such as chaco, yungas, and valles, can be used either in a general sense or as a proper noun or part of the name of a specific place or area. When used in the specific sense to refer to the Bolivian Altiplano or the larger Andean Altiplano, Altiplano is capitalized. If used to refer to high plains in general, lower case altiplano is used.

ALTO MADIDI, *see* Moire.

ALTO PALMAR, *see* Palmar.

ALTWA SAN JUAN; Beni 1308/6444 (MARU)
MARU 1963, 4 km S of San Juan.

AMBORÓ, *see also* San Rafael de Amboró.

AMBORÓ, CERRO; Santa Cruz 1744/6339 (USBGN)
J. Steinbach, Mar. 1916 (Crespo, 1974: 16); F. Steinbach, Sept. 1947; Riddle, Sept. 1985, río Pitasama, 4.5 km N and 1.5 km E of Cerro Amboró, 620 m (1745/6340).

AMULLAJTA; La Paz 1702/6748 (USBGN)
Baudoin, 1970, 5 km down valley from Caracato, also spelled Amullachta.

ANDES OF BOLIVIA, *see* La Paz.

ANDRÉS IBÁÑEZ; Santa Cruz 1745/6315 (USBGN)
F. B. and J. Steinbach, Apr.–July 1937, 430 m; a province later known as Cercado.

APERE, RÍO; Beni 1344/6518 (USBGN)
AMNH, 1965, 4 or 5 km above mouth (1345/6519); Tello, July 1986, río Apere (1400/6515), and Aug. 1986, río Apere flood plain about 40 km W of San Ignacio de Moxos (1448–6555).

APOLO; La Paz 1443/6830 (MAPA)
1440 m, on río Beni headwater; now province of Franz Tamayo; Weddell, 1853; Deville (1849: 55) and Weddell (1853), type locality of *Midas Weddellii* (= *Saguinus fuscicollis weddellii*) as Province of Apolobamba; Abel Fornes, 1969; Emmons, June 1990, 50 km W of, at 1500 m, 5 km beyond Correo on new road to La Paz (1455/6820); Emmons, June 1990, 17 km N of, at 1000 m, on trail to Tuichi, on río Machariapo, a tributary of río Tuichi (1434/6828).

APOLOBAMBA, *see* Apolo.

ARANI; Cochabamba 1734/6546 (USBGN)
9000 ft (= 2770 m), d'Orbigny, Oct. 1830, d'Orbigny (1834-1847); F. B. Steinbach, Jan. and Feb. 1927, Sept. 1928, Feb. 1939; Baptista and Salazar, June 1987, 17 km by road W of (1731/6555); Kessler, Aug. 1991, 3350 m, 25 km S of, on road to Mízque area (1738/6539).

ARAONAS; La Paz 1230/6830
Harada, 1984; Iseki et al. (1985).

ARIRUMA; Santa Cruz
AMNH-MSB party, June 1991, 7 km (by road) SE of (1824/6419), 1750 m.

AROMA; La Paz 1717/6734
No other data.

ARQUE; Cochabamba 1748/6623
Collins-Day Expedition (Osgood, 1916: 199); perhaps this locality.

ARROYO CANADA; Pando 1123/6658
AMNH, July 1986, mouth of.

ARROYO MERCEDES, *see* Buena Hora.

ARRUDA; Beni N.L.
MARU, 1963–1964.

ASCENSIÓN DE GUARAYOS; Santa Cruz 1542/6305 (USBGN)
MARU, June 1964, in province of Ñuflo de Chávez; AMNH-MSB Aug. 1985, 6 km by road W of Ascensión (1543/6309).

ASTILLERO; La Paz ca. 1616/6733
Simons, Nov. 1900, Feb. 1901, Thomas (1902a: 129), 2700 m; Thomas (1914: 362), type locality of *Sciurus cuscinus ochrescens* (= *S. ignitus ignitus*); Hershkovitz (1962) as Astilleras.

ASUNTA; Beni 1307/6523 (MARU)
MacKenzi, Nov. 1971. But also see San Joaquín.

ATACHEBA; Cochabamba N.L.
J. Steinbach, Aug. 1920 (FMNH)

ATOCHA; Potosí
AMNH-MSB party, Sept. 1986, 40 km by road SE of, 4000 m (2107/6602).

ATOLLADAR; Chuquisaca N.L.
Arduz, Aug. 1951, in valley of río Bañado.

AVAPÓ, *see* Abapó.

AXOJO; Beni N.L.
Boca Axojo (*Inia*).

AYACUCHO; Santa Cruz 1700/6355
Estación on railroad, AMNH and CENETROP, Oct. 1987, 250 m.

AYACUCHO; Santa Cruz 1751/6320 (USBGN)
In province of Ibáñez; Acasigue, Becerra, Kerr, Ridell, Villalobos (MARU), Aug. and Oct. 1966; also 1 km E of Ayacucho.

AYANE, see Yani.

AYATA; La Paz 1521/6845 (USBGN)
Yoneda, June 1982.

AYDAYO 17??/6822
Felis concolor at USNM, 20 km W of Aydayo; minutes of latitude unknown.

AYOPAYA; Cochabamba 1630/6635 (USGBN)
Province in western Cochabamba; d'Orbigny, Sept. 1830; as Ayupayo, F. B. Steinbach, June, July, and Aug. 1953, some recorded as Ayopaca, 3500 m.

AZERO, RÍO; Chuquisaca 1912/6357 (USBGN)
Carriker, Nov., 1936, 1220 m; Azuero (USBGN)

AZUNTA, *see* San Joaquín.

BAHÍA CHAPLIN, LAGUNA; Santa Cruz 1428/6102
EBD party, Aug. 1986, in Velasco province.

BAHÍA DAS ONÇAS; Beni 1205/6445 (MAPA)
On río Iténez ca. 50 km NW of Principe da Beira. AMNH, July 1964; between Bahía das Onças and Casa Alta.

BAHÍA DE LAS PIEDRAS N.L.
Hydrochaeris specimen.

BAHÍA DE LOS CASARA; Beni 1313/6220
AMNH, Aug. 1964; see Larangeiras.

BAJO PALMAR, *see* Palmar.

BALLIVIAN; PROVINCE OF; Beni

BALNEARIO LAS POZAS; Cochabamba 1657/6523
EBD party, Sept. 1982, see Villa Tunari.

BALZON, LAKE; E. Bolivia N.L.
Tate (1933: 198).

BANANEIRA, CACHUELA: Beni 1036/6525 (USBGN)
Natterer, 3 Sept. 1829 (Pelzeln, 1883: 127) as Cachoeira do Bananeira.

BANARES, RÍO; Beni (?) N.L.
Natterer, Aug. 1829 (Pelzeln, 1883: 127); possibly río Baures?

BARADOR, PUERTO, *see* Puerto Varador.

BARRANQUITA; Beni 1313/6448
MARU, 1963, or 10 km S of (1318/6448); also Estación Barranquita; probably this is Bauricito (MAPA, USBGN, 1313/6448).

BARRERAS, LAS; Santa Cruz 1726/6305 (MARU)
Hibbs, July 1965; 11 km NE of Warnes.

BASILIO; Santa Cruz 1808/6312 (USBGN)
Becerra, Kerr, Villalobos, Acasigue, Oct. 1966, 45 km SSW of Santa Cruz, in province of Cordillera; at Basilio and 3.4 km S of Basilio (1810/6312); MNK party, Aug. 1992, 2 km W of (1807/6313).

BATO; Beni, *see* río Negro.

BAURES; Beni 1335/6335 (USBGN)
MARU, 1963; Ranck, Nov. 1966.

BAURES, RÍO; Beni 1230/6418 (IGM)
AMNH party, October 1964.

BELÉM; Beni 1230/6340
AMNH, July 1964, island in río Iténez between Santa Rosa and Isla de Bispa.

BELGICA, LA; Santa Cruz 1733/6313
MSB party, June 1988, 4 km SW of (1735/6315); MNK party, Feb. and June 1992, 2 km S of (1731/6312).

BELLA ESPERANZA; Santa Cruz N.L.
Silva, June 1948, in province of Cercado, now Ibáñez.

BELLA VISTA; Beni 1340/6550
Estancia between Santa Ana de Yacuma and Santa Rosa, photo of *Chrysocyon* skin by Jaime Peralta T., 23 Oct. 1992; see also Boa Vista.

BELLAVISTA, SERRANÍA; La Paz 1540/6735
Schmitt and Remsen, June 1979, a tea plantation, 35 km by road N of Caranavi, 1650 m (1540/6735); Webster, 1979 (Webster and Jones, 1980); 47 km by road N of Caranavi, 1350 m (1538/6732); AMNH-MSB party, as Bella Vista, July 1992, at 1300 m (1542/6729 GPS), and at 1525 m (1541/6730 GPS).

BELLA VISTA; La Paz 1520/6813 (USBGN)
Simons, Aug. 1900, 1400 m; Andersen (1906: 419), as Bellavista, type locality of *Uroderma Thomasi* (= *Uroderma bilobatum thomasi*).

BELLA VISTA; Pando 1123/6712
AMNH-MSB party, July 1986, 170 m.

BENI, RÍO; 1023/6524 (USBGN)
Gray (1866b: 826), type locality of *Cebus pallidus* (= *C. apella pallidus*), by restriction (Cabrera, 1958: 166); Dr. Heath, prior to 1901, exact location unknown; Mann, June and Sept. 1922; Scherrer, Apr.–May 1925, exact location unknown; AMNH, MSB, and IBBA party, Sept. 1985, (1304/6711, 1309/6712, 1315/6718, 1316/6717, 1401/6731, 1416/6732, all in La Paz, and 1315/6717 and 1327/6721, in Beni); Dickerman and Ruedas, July 1986, on W bank opposite Hamburgo, 160 m, in Pando (1101/6606); AMNH-MSB party, July 1986, left bank, 160 m (1057/6603); see also Consuelo.

BENI RESERVE; Beni
Salazar, Sept. 1987, at río Curiraba, "BIOLAT ZONA 2" (1450/6623), see Estación Biológica de Beni and Porvenir.

BERMEJO; Santa Cruz 1810/6336 (MAPA)
Miller and Boyle, Oct. 1915, 3500 ft (= 1100 m).

BERMEJO, RÍO; Tarija 2651/5827 (USBGN)
Carriker, Sept. 1936, 410 m, at Bermejo (2210/6442); Carrizo, Daneri, and Vinas, July 1989 (Vaccaro, 1990), left bank opposite mouth of río Lipeo (2227/6430).

BETHANIA; Beni N.L.
MARU, 1963, Estancia Bethania, 35 km E of.

BIATA, RÍO; Beni 1144/6648
AMNH-MSB party, Aug. 1986, 170 m, at San José about 1 km above mouth of río, designated as boca del río Biata (1144/6647).

BIBOSI; Pando ca. 1150/6840
An estancia; CBF, year unknown.

BLANCO, RÍO; Beni N.L.
MNLP, Sept. 1983.

BLANCO, RÍO; Cochabamba 1636/6637
Simons, June 1901; see Charuplaya, coordinates erroneously given as 1550/6748 by Smit (1987: 215).

BOA VISTA; BENI 1306/6348 (MAPA)
Also Bella Vista or Buena Vista; Webb, Apr. 1970; Remsik (specimen from Harris), Mar. 1980, about 1000 ft elevation, see San Joaquín also; which location uncertain.

BOBICA N.L.
Wesmael (1841: 59), type locality of *Mastonotus popelairi* (= *Myocastor coypus popelairi*).

BOLIVAR; Tarija 2138/6234
An estancia; AMNH-MSB party, Aug. 1991, 400 m; 4 km N of (2136/6234), 400 m; 5 km W of (2138/6237), 400 m.

BOLIVIA, LAGUNA; Beni N.L.
CBF party, June 1992, TIPNIS; 1 km N of; at mouth of Arroyo Negro; W bank of and N of.

BOLIVIA
Gray (1846: 212), type locality of *Jacchus leucomerus* (= *Callithrix argentata melanura*); Gray (1850b: 380), by inference from the name, type locality of *Coendou boliviensis* (= *Coendou prehensilis boliviensis*); Gray (1873b: 16), by inference from the name, type locality of *Tatusia boliviensis* (= *Dasypus novemcinctus novemcinctus*); Brass (1911: 613), by inference from the name, type locality of *Chinchilla boliviana* (= *C. lanigera*).

BOLIVIAN CHACO
Thomas (1898b: 2).

BOLIVIAN CORDILLERA
d'Orbigny.

BOLPEBRA; Beni 1330/6426
Estancia; Yates and Salazar, Mar. 1993.

BOROICA; Beni 1313/6409 (USBGN)
P. A. Webb, Apr. 1970, in Itonama Province.

BOYUIBE; Santa Cruz 2025/6317 (USBGN)
de la Barrera, 1955, spelled Boyuiba; Bromley, Aug. 1957, spelled Boyuibi; AMNH-MSB party, July 1991, 53 km E of (2027/6250), 600 m; 26 km E of (2026/6302), 800 m; 1 km S and 4.5 km E of (2027/6314), 815 m.

BRESTA; Beni ca. 1433/6720 (MHA)
Olalla, 1938; Lönnberg (1942: 55).

BUENA HORA; Brazil 1133/6512 (RON)
Used to designate places in Beni; AMNH, May 1965, Arroyo Mercedes, 6 km S of Buena Hora (1136/6512); 5 km SW of (1134/6513); See RON, there are two places named Boa Hora in Rondonia, fieldnotes indicate the northern one.

BUENA VISTA; Beni 1306/6348 (MAPA)
MARU, 1963, on río Blanco, 25 mi E of Magdalena, also termed Bella Vista or Boa Vista.

BUENA VISTA; Santa Cruz 1727/6340 (USBGN)
J. Steinbach, at various times from 1914 through 1938, 500 m; F. Steinbach, at various times from 1926 through 1952; Miller and Boyle, Aug. 1915, 1300 ft (= 400 m); Thomas (1928b: 293), type locality of *Cyclopes didactylus catellus*; Nelson and Goldman (1929), type locality of *Felis concolor osgoodi*; Tate (1931b), type locality of *Marmosa agilis buenavistae* (p. 10, = *Gracilinanus agilis buenavistae*); *Marmosa ocellata* (p. 7, = *Marmosops dorothea*); Pocock (1941b), type localities of *Leopardus pardalis steinbachi* (p. 235, = *Felis pardalis steinbachi*) and of *Leopardus wiedii boliviae* (p. 237, = *Felis wiedii boliviae*); Cabrera (1958), restricted type locality of *Arctopithecus gularis* Gray (1850c) (= *Bradypus variegatus*) to here; Nelson and Goldman (1933: 229), type locality of *Felis onca boliviensis* (=

Panthera onca); G. L. Ranck, Nov. 1966; Schmitt and Cole, Dec. 1978 and Jan. 1979, 7 km N and 17 W of Buena Vista (1724/6344), at km 119 on road to Yapacaní, Propiedad Nuevo Mundo, 353 m; Creighton, Feb. 1980, 25 km (by road) W of Buena Vista, on W bank of río Yapacaní (1724/6346), 400 m; Harada, Aug. 1984; MSB party, Aug. 1987, 2 km SW of (1728/6341), 2 km WSW of (1728/6341), 4 km SW of (1728/6342), and 6 km S of (1730/6340); MSB party, July 1993, 16 km by road E of (1723/6333).

BUEN RETIRO; Santa Cruz 1717/6338 (MAPA)
Delgadillo, 1950, province of Ichilo; de la Barrera, Oct. and Nov. 1954 (Hopkins and Rothschild, 1966: 120, gave coordinates as 1716/6345); AMNH-MSB, Sept. 1984, 4.5 km N of, 300 m (1714/6338); Anderson et al. (1987); 6 km N of, 300 m (1713/6338, restricted type locality of *Ctenomys steinbachi* Thomas, 1907b); MSB party, Aug. 1987, 3 km N of (1716/6338).

BUSURUCUCÚ; Beni 1439/6617
Campamento in Estación Biológica de Beni; Hinojosa and Salazar, June, Aug., and Oct. 1988.

CABALLO, *see* Cabayu Nambi.

CABALLO, PUERTO; Beni 1343/6521 (USBGN)
AMNH, Sept. 1965.

CABAÑA; Beni 1450/6621
An estancia; Flores, Nov. 1985, CBF, 40 km [E of] San Borja, between estancias Tajibos and Florida; see also Ulla Ulla and Tabana.

CABAYU NAMBI; Tarija 2138/6301 (MAPA)
An estancia; Eisentraut, Oct. 1979, for ZFMK; 90 km SE Villa Montes, as Caballo Nambia; as El Cabayo Nambi (2138/6258) in USBGN.

CABEZAS; Santa Cruz 1846/6324
de la Barrera, July 1955 (Fonseca, 1959: 93).

CABRADA, POSTA LA; Chuquisaca 1905/6505 (Chubb, 1919: 5)
Simons, Sept. 1901, 3500 m, as El Cabrado; Thomas (1902c: 116), type locality of *Andinomys edax*.

CABRERA; Beni 1323/6440 (MARU)
Webb, Feb. 1969.

CÁCERES; Santa Cruz 1857/5747
Daveron, prior to 1941, to W of [Laguna] Cáceres near Bolivian-Brazilian border; also São Luis de Cáceres.

CACHIMAYO, RÍO; Potosí 1918/6612 (USBGN)
Tributary on the left bank of the río Pilcomayo; Miller and Boyle, 1915; Miller (1918).

CACHOEIRA DO BANANEIRA; Beni 1036/6525 (MAPA)
Natterer, 1829; Wagner (1842b), type locality of *Callithrix brunea* (= *Callicebus brunneus*), by revisor's designation (Hershkovitz, 1963a); on río Mamoré.

CACHUELA CAMP, *see* río Abuna.

CACHUELA ESPERANZA; Santa Cruz 1647/6314
An estancia; AMNH-MSB, Aug. 1984, 300 m.

CACHUELITA; Beni 1312/6410 (MARU)
Webb, 23–24 Apr. 1970, on río Itonamas.

CAFECES, see Montegrande. N.L.

CAFETAL; Beni 1325/6435
Barba (USNM), July 1966, about 20 km SE San Ramón.

CAIGUA; Tarija 2110/6326
Eisentraut (1986) reported *Catagonus* from near here.

CAIZA, see Villa Ingavi.

CAJUATA; La Paz 1649/6715
MNLP, 1982, 1817 m.

CALABATEA; La Paz ca. 1600/6750
Carriker, Nov. 1934, 1400 m; MNLP, Mar. 1981.

CALABATEA; La Paz 1458/6830
RAP, May and June 1990, camp (Emmons, 1991).

CALACOTO, *see* La Paz.

CALAHUASI; Cochabamba 1740/6446
Olrog, Aug. 1959, "250 km E of Cochabamba," also Carahuasi.

CALIFORNIA; Santa Cruz N.L.
Miller, Oct. 1915; a valley near Comarapa; Miller (1918: 331).

CALLIPAMPA; Oruro ca. 1835/6657
Carriker, June 1936, 12,000 ft (= 3660 m).

CALUYO, *see* Kaluyo.

CAMACHO, PUERTO; Pando 1131/6742
CBF party, Oct. 1991, in Manuripi province, 15 km NO de [= NW of] (1128/6750); 25 km de Comunidad Camacho at Madrid (coordinates unknown).

CAMANDÚ; Beni
M. Ayala, May 1988, SW of río Matos (probably SW of 1451/6621); also see Katmandú.

CAMARGO; Chuquisaca 2039/6513 (USBGN)
O. P. Pearson, Oct. 1955, 8500 f (= 2615 m); Hershkovitz (1962: 62); AMNH-MSB party, Sept. 1986, 68 km by road E of, 3400 m (2009/6517).

CAMATAQUI, see Villa Abecia.

CAMATINDI; Chuquisaca
AMNH-MSB party, July 1991, 1 km S of (and in Tarija; 2100/6323), 650 m.

CAMIACO; Beni 1519/6444 (AMNH field map)
AMNH, Aug. 1965, = 16 km N Limoquije; "1515/6446" (Eger, 1974: 4); 6 km N of (1516/6444).

CAMIARE; Beni 1415/6550
Cabot and Castroviejo, Apr. 1982, Yacuma province, near Estancia Venecia.

CAMINO CUPESI; Santa Cruz N.L.
Silva, Apr. 1938, in province of Cercado, now Ibáñez.

CAMINO VILCHES; Beni 1304/6448 (MARU)
MARU, 1963 and Feb. 1966, on río Machupo near San Joaquín.

CAMIRI; Santa Cruz ca. 2005/6334 (MAPA)
Moll, prior to 1939, "Camiri and Choreti Regions, Chaco Frontier"; Cors Medina, 1941, 5 km S of Choreti in Azero province; Trusta, near Camiri, Aug. 1964; Acasigue and Becerra, Sept. 1966; Kerr, Sept. 1966, at Cordillera Yuti, 10 km S Camiri, (2010/6330); Cabot, Nov. 1984, 15 km [N of] (1955/6334); Cook and Gardner, July 1985, 17 km N of (1955/6334).

CAMPAMENTO ENDE, *see* Colorada, Laguna.

CAMPAMENTO I; *see* Sajama.

CAMPAMENTO II; Cochabamba N.L.
Tapia, Mar. 1990; in province of Carrasco; a field station of the University of Cochabamba.

CAMPAMENTO 6 DE AGOSTO; Beni 1517/6705
Cabot, Nov. 1984 (Cabot, 1989; Salazar et al., 1994: 126).

CAMPAMENTO 08; Beni 1444/6615
In Estación Biológica de Beni, Gomez, Hinojosa, and Salazar, Aug. and Oct. 1988; or Campamento Chimán 08.

CAMPO DE GUANACOS; Santa Cruz ca. 1900/6300 (Doutt, 1938: 100)
J. Steinbach, Aug. 1909; Doutt (1938), 450 m, type locality of *Galea spixi campicola* (= *Galea spixii campicola*); in the western part of the province of Cordillera; also spelled Guanakos.

CANDELARIA, PUERTO; Pando 1102/6613
Flores, Aug. 1985.

CAÑUMA; La Paz
Villalba, 1989, Cabaña, río Cañuma, province of Franz Tamayo.

CAPAPARI N.L.
Maddren, 1924, 10 mi S of, perhaps equals Carapari.

CAPIRENDA, RÍO; Chuquisaca ca. 2028/6404
Hershkovitz (1960: 561); see Ticucha.

CAPIRENDO; Tarija 2107/6300 (MAPA)
Stager and Bromley, Aug. to Nov. 1957, 15 km NE of (2101/ 6254), 7 km N of (2103/6300), 8 km NE of (2104/6257), 5 km S of (2110/6300), 7 km S of (2111/6300), 12 km SW of (2112/6305), 10 km S of (2113/6300), 13 km SW of (2113/6305), 20 km SW of (2115/6308); also spelled Capirenda; as Caipipendi (USBGN and MAPA) in Chuquisaca.

CAPIVARA; Beni 1242/6308 (USBGN)
AMNH, July 1964.

CARACATO; La Paz 1659/6749 (USBGN)
Baudoin, Aug. 1970; Anderson party, Apr. 1982, 2900 m.

CARACOLLO; Oruro 1739/6710 (USBGN)
3840 m, (MHA); Simons, Mar. 1901; Thomas (1902a: 143) as Caracolto at 4000 m; Instituto de Ecología, May 1979; Cabot and Yoneda, 1982.

CARAHUARANI; La Paz ca. 1530/6758
Road from Carahuarani, via Tipuani Gold Mine, to Chuguini, 3000 m down to 2000 m and back to 3000 m, Tate, Apr. 1926; Tipuani is at 1533/6800.

CARAHUASI; Cochabamba 1740/6446
IML, 1959.

CARANAVI; La Paz 1546/6736 (USBGN)
In province of Nor Yungas; Webster, Feb. 1978, 8 km SE of (1548/6734), in June 1978 at 606 m, July and Aug. 1979; 10 km W of (1546/6741), in June 1978; 20 km N of (1542/6736), in Jan. 1978; 5 km E of (1546/6734); Creighton, May 1978, 20 km (by road) NNE of (1542/6735), 2000 ft; Schmitt and Cole, two localities—Mar.–Apr. 1979, 6.6 km (by road) downstream from Caranavi (1538/6739), in río Coroico Valley, east bank, 653 m; and, June 1979, 35 km (by road) N of Caranavi at Serranía Bella Vista (1540/6735), 1650 m; Webster, 1979 (Webster and Jones, 1980), 606 m at the town; Remsen and Cardiff, July 1980, 47 km (by road) N of Caranavi at Serranía Bella Vista (1538/6732), 1350 m; Hinojosa, Mar. 1988, 5 km N of (1544/6735), and 8 km N of (1541/6731); EBD party, date uncertain, 2 km E of (1546/6735).

CARANDA; Santa Cruz 1732/6331
MSB party, Aug. 1987, 1.5 km SW of (1733/6332), 2 km S of (1733/6332), 3 km SE of (on río Metillas, 1734/6331).

CARANDAYTI; Chuquisaca 2045/6304 (USBGN)
Bromley, Aug. to Oct. 1957, also spelled Carandaita or Carandaiti; Stager, July 1957, 10 SE of (2049/6308); 18 km SE of (2053/6312); 30 km SE of (2058/6251); 35 km S of (2106/6304); AMNH-MSB party, July 1985, 4.5 km by road W of (2045/6306), 3.8 km by road E of (2046/6303), 9 km by road E of (2046/6300), 9.7 km by road E of (2046/6300).

CARAPARI; Tarija 2149/6346 (USBGN)
Budín, Apr., July, and Aug. 1924, 1000 m; Thomas (1925), type localities of *Akodon sylvanus pervalens* (p. 579, = *A. pervalens*); *Mazama sarae* (p. 581, = *Mazama americana sarae*); *Oryzomys legatus* (p. 575); Thomas (1925: 580) as Carapiri; type locality of *Oxymycterus paramensis jacentior*; F. Steinbach, field number 653, year unknown; AMNH-MSB party, Aug. 1991, 3 km WNW of (2148/6347), 850 m.

CARAVANI, *see* San Joaquín.

CARICARI, *see* Kari Kari.

CARLAZO; Tarija 2128/6432 (USBGN)
Budín, Mar 1924, Feb., Mar., and May 1925; Thomas (1926b: 322), 2200 m and 2300 m, "40 km to the east of" (2128/6410); and type locality of *Marmosa janetta* (p. 327, = *Thylamys elegans venusta*), see also Tarija.

CARMEN; Beni 1356/6340 (MAPA)
C. Gans, Feb. 1954; MARU, 1963, or El Carmen, on río Blanco.

CARNAVAL; Beni, *see* Espíritu.

CARRASCO, PARQUE NACIONAL; see Villa Tunari.

CASABINDO, CERRO; N.L.
Cabrera (1961: 558).

CASARA, *see* Bahía de los Casara.

CASARABE; Beni 1448/6414 (USBGN)
Anderson, Aug. 1983, 230 m, 6 km W of (1454/6422); Ruedas and Cuenca, Aug. 1985.

CASCAJAL; Beni 1213/6513 (USBGN)
AMNH, May 1965, collected at Cascajal and opposite Cascajal on E side of río Mamoré.

CASTEDO, *see* San Ramón.

CASTOR, *see* Khastor.

CATAGAITA; Potosí 2050/6540
Pearson, Sept. 1955, 30 mi WNW of (2043/6557), 11,000 ft (= 3385 m); also spelled Cotagoita or Cotagaita.

CATAVI; Potosí 1824/6636 (USBGN)
Carriker, May 1936, 12,600 ft (= 3840 m).

CATMANDÚ, *see* Katmandú.

CAVINAS; La Paz 1236/6701 (USBGN)
Dasyprocta from zoo, in USNM, died 1927.

CAYOBA; Beni 1310/6413 (MARU)
Webb, Feb. 1969 and Apr. 1970, or La Cayoba; SNCFHB, Jan. and Feb. 1985 (Torres et al., 1988).

CEDRITO, EL; Santa Cruz 1748/6311
Tapia, Sept. 1992, cave near río Pirai at west edge of Santa Cruz de la Sierra.

CENTINELA; Beni N.L.
MARU, 1963, on río Machupo, also spelled Centenela.

CENTRO DIECIOCHO; Pando 1036/6647
RAP team in June and July 1992, 18 km NNW of San Juan de Nuevo Mundo, a seasonally used castaña camp.

CENTRO GRANDE (Centro Branda); Pando 1120/6908 (USBGN)
Izawa, Nov. and Dec. 1979.

CERCADO, *see* Andrés Ibáñez.

CERDAS: Potosí 2048/6629 (USBGN)
Carriker, Feb. 1938, 3900 m.

CERRO, *see* names such as Amboró, Itahuaticua, etc.

CERRO COLORADO; Santa Cruz 1927/6221
An estancia; EBD party, Sept. 1986; 10 km S of (1933/6221); 50 km S of, at Perforación (1955/6233); 58 km S of (2000/6233).

CHACALTAYA, MT.; La Paz 1620/6808 (USBGN)
Barker.

CHACO; when used as a proper noun as in Gran Chaco, the word is capitalized. When used in the general sense of any clearing or open area, it is not capitalized. The same dichotomy of usage arises with the words yungas and valles.

CHACO, EL; Beni, *see* Espíritu.

CHACO LEJOS; Beni 1324/6442 (MARU)
Barba, July 1966, ca. 20 km SE of San Ramón; also as Chaco Lejo.

CHACO MAIZ; Beni 1333/6429
An estancia; Yates and Salazar, Mar. 1993, 15 km NW of El Valle.

CHALLANA, RÍO, *see* Guanay.

CHALLAPATA; Oruro 1854/6647 (USBGN)
Simons, Oct. 1901, 3800 m, east of Lake Poopó (Thomas, 1902b: 225), type locality of *Phyllotis hirtipes* (= *Eligmodontia puerulus*); Thomas (1902e: 161), type locality of *Marmosa elegans pallidior* (= *Thylamys pallidior*); Anderson, Nov. 1979, 45 km and 123° [= compass bearing] from Challapata (1910/6625); *Galictis* at CBF (Yensen et al., 1994: 408).

CHAPARE; Cochabamba 1709/6530
F. B. Steinbach, June and July 1927, at 2000 m (the old road from Cochabamba into the Chapare valley passed the 2000 m elevation just above El Palmar at about 1709/6530), Sept. 1939, at 2700 m, Dec. 1941, Nov. 1948; Zischka, 1945, 1954, 1962 (Munich, R. M. Wetzel, personal commun.); mouth of río at 1558/6841; Yoneda, Sept. 1982. A large area is known as the Chapare.

CHAPARE, RÍO; Cochabamba 1558/6442
Carriker, Aug. 1937, 250 m.; Arce Pereira et al. (1963) reported various mammals from the río Chapare, without specimens. See also río Ichilo.

CHAQUECAMATA, *see* Choquecamata.

CHARAL, EL; Beni 1523/6706
CBF, 1989, 6 km on road to Yacumo from Quiquibey.

CHARAQUA; Santa Cruz 1948/6313 (USBGN)
Wavrin, (*Myotis*), BM; de la Berrera, July 1955 (Fonseca, 1959: 93), or Charagua.

CHARAZANI; La Paz 1512/6902 (MAPA)
Anderson, Sept. 1980, 3450 m, also known as General Juan José Pérez; also 2 km W of (1512/6903).

CHAROPLAYA; Cochabamba ca. 1636/6637
Simons, May and June 1901; probably on the río Santa Elena rather than the headwaters of the río Sécure, at 1300 to 1400 m, northward of Lagunillas (Chubb, 1919); Thomas (1902a), type localities of *Coendou simonsi* (p. 141, = *C. bicolor simonsi*), *Oryzomys yunganus* (p. 130), and *Proechimys securus* (p. 140, = *P. longicaudatus securus*); Allen (1915a: 205) as Charumplaya; Thomas (1916h: 478), type locality of *Oxymycterus doris* (= *Oxymycterus inca doris*); usually spelled Charuplaya.

CHASQUIPAMPA; La Paz 1631/6800 (Yoneda, 1984)
Yoneda, Apr. 1982, 3750 m.

CHATARONA; Beni 1422/6728 (USBGN)
Carriker, Sept. 1934, 180 m, as Chaterona.

CHIANTA; Oruro N.L.
A *Phyllotis* presented to the British Museum in 1912 by Frank A. Moss; 12,000 ft (= 3690 m), Hershkovitz (1962: 247). According to Hershkovitz's map (p. 245), Chianta is very near Challapata, Oruro; also spelled Chayanta.

CHICO, RANCHO; Santa Cruz 2015/6234
EBD party, Sept. 1986.

CHIJCHIPA; La Paz 1608/6744 (USBGN)
IBBA, Feb. to Apr. 1985, in Nor Yungas province, ca. 1400 m; or Chijchipani, Ruedas, Aug. 1986; AMNH-MSB party, as Chijchijpa, at 1114 m (1609/6745 GPS) and 1224 m (1609/6744 GPS).

CHILCANI; La Paz 1544/6840
Olalla, July and Aug. 1938, near Mt. Illampu, 3700 m (Patterson, 1992: 5).

CHILEAN BORDER; La Paz 1730/6930
Specimens in Frankfurt, "at border to Bolivia and Peru."

CHILILAYA; La Paz 1613/6827 (Rusby, 1933)
O. and G. Garlepp, Aug. 1893, on Lago Titicaca; Simons, Sept. and Oct. 1900, 4000 m; also spelled Chililya.

CHIMASI; La Paz 1530/6753 (USBGN)
Simons, Jan. and Feb. 1901, June 1903, 1500 m, Yungas, as Chimosi.

CHIMATE; La Paz ca. 1525/6800
Simons, Sept. 1900; Thomas (1901b: 369), at 700 m, type locality of *Rhipidomys benevolens* (= *Oecomys bicolor bicolor*); Thomas (1903b: 488), type locality of *Sciurus castus* (= *S. spadiceus*); spelled Chirimote by Gyldenstolpe (1932: 40), and Chimote by Tate (1932f: 20).

CHIMATE, RÍO; La Paz ca. 1525/6800 (Tate, 1926)
Tate, Apr. 1926, 1900 ft (= 585 m); tributary of río Mapiri about 4 hours below the río Velique on the same side.

CHIMATI; La Paz N.L.
Pusch (1941: 209), type locality of *Cebus apella sagitta* (= *C. apella pallidus*).

CHIMORÉ, RÍO; Cochabamba 1643/6449 (USBGN)
Miller, Aug. 1915; Miller (1918: 311); AMNH, July 1965, 2 km N of mouth of the river (1642/6449); Stearman, Mar. and Apr. 1991, in Carrasco province; see also río Ichilo; also spelled Chimori.

CHIMORI; La Paz N.L.
ANSP.

CHIMOSI; La Paz 1530/6753(USBGN)
1700 m; Thomas (1910c: 505), type locality of *Dasyprocta variegata yungarum* (= *D. punctata yungarum*); see Chimasi.

CHIÑIRI; La Paz 1516/6745 (USBGN)
Carriker, Aug. 1934, 335 m, on or near río Kaka.

CHIPIRIRI; Cochabamba 1611/6518
Río; Arce Pereira, 1962, (Arce Pereira et al., 1963).

CHIPIRIRI; Cochabamba 1635/6525
Cabot, Aug. 1988, 450 m, cercanias de San Pedro.

CHIQUITOS; Santa Cruz 1750/6048
300–1000 m, d'Orbigny; province in llanos of E Santa Cruz; San José de Chiquitos (1749/6045); Kreig, 1925, 1926; Olrog, ca. 1960; San José de Chiquitos, Becarra, Oct. 1966; Heltne, Freese, and Whitesides, primate census, Aug. 1975 (Heltne et al., 1976: appendix I; near Esperanza at 1730/6052 some 40 km N and 12 km W of San José de Chiquitos; near Natividad at 1755/6055 some 20 km W and 10 km S of San José de Chiquitos; and at 1750/6035 some 20 km E of San

José de Chiquitos on road to Roboré); Cook and Moore, Oct. 1984, 4 km S and 24 km E of (1752/6031); Olrog, Aug.–Sept. 1959.

CHIVÉ; Pando 1223/6835 (USBGN)
Yoneda, July 1982, as "1250/6840"; Harada, Sept. 1984; AMNH-MSB party, July 1986.

CHIYIJTE N.L.
F. B. Steinbach, Feb. 1939.

CHOCAYA; Potosí 2115/6545 (Paynter et al., 1975)
Carriker, June 1936, 3660 m.

CHONTA, LA; Santa Cruz N.L.
MNK party, Oct. 1992, on río Negro.

CHOQUECAMATA; Cochabamba 1655/6637 (USBGN)
Simons, July 1901; Thomas (1902a), type localities of *Oxymycterus paramensis* (p. 139, = *O. paramensis paramensis*) and of *Akodon puer* (p. 136, = *A. lutescens puer*), 4000 m on high páramos northwest of Cochabamba; usually Chuquicamata; Reed, 1939, mountains near, as Chaquecamata.

CHORETI; Santa Cruz 2003/6335 (MARU)
MARU, Sept. 1966; see also Camiri.

CHORO, El; Cochabamba 1656/6642 (USBGN)
Simons, May, July 1901, 3200–3500 m, en el Alto Sécure, province of Ayopaya; Thomas (1902a), type localities of *Akodon bacchante* (p. 138, = *Chroeomys jelskii bacchante*), *Akodon fumeus* (p. 137); *Phyllotis lutescens* (p. 131, = *Phyllotis osilae osilae*); *Conepatus chorensis* (p. 126, = *Conepatus chinga rex*), *Eligmodontia carilla* (p. 133, = *Calomys lepidus carillus*); Thomas (1920b: 363), type locality of *Eptesicus montosus* (= *E. furinalis montosus*); F. B. Steinbach, June, July, and Aug. 1953, 3500 m.

CHORO, EL; Oruro 1821/6708
AMNH-MSB, Oct. 1986, *Chaetophractus* obtained by Carmiña Miranda Moreira and Freddy Cáceres Vega.

CHUHUAYACO, *see* Chuyayacu.

CHULUMANI; La Paz 1624/6731 (USBGN)
d'Orbigny, 1830, 2000 m; Kalinowski, 1896; Simons, Nov. and Dec. 1900, Jan. and Feb. 1901, at 1600, 2000, and 2200 m; Allen (1901c: 411), type locality of *Metachirus nudicaudatus bolivianus*; (Thomas, 1907b: 163) type locality of *Grison furax luteola* (= *Galictis vittata luteola*); as 1800 m, Thomas (1917a: 158), type locality of *Cavia nana* (= *C. aperea sodalis*); Olalla, Sept. 1938, 1740 m (Patterson, 1992: 5); Lönnberg (1941: 42), type locality of *Aotus roberti* (= *Aotus azarai boliviensis*); capital of Yungas Province; 1734 m.

CHUQUINI; La Paz 1534/6804 (USBGN)
Tate, Apr. 1926, ca. 3000 m, "A house on the Gritado River which is tributary to the Tipuani on its right-hand side," also "road from Chuquini to Tora, 3000—3400 m."

CHUQUISACA, *see* Sucre.

CHURO NEGRO, *see* Comarapa.

CHUSMAS, RÍO; N.L.
Olrog, Aug. 1957, 5 km W of Las Madrejones.

CHUSPIPATA; La Paz 1618/6748 (IGM)
Remsen party, July 1981, 1 km S of, 3050 m (also see Sacramento Alto and Cotapata); Mercado, Nov. 1990; CBF, Apr. 1992, Cerro Chuspipata.

CHUYAYACU; Chuquisaca 1943/6352
Arduz, Aug. 1951; AMNH-MSB party, Aug. 1990, 2 km E of Chuhuayaco, 1200 m (1943/6351).

CIENEGA, *see* Vallegrande.

CINCO; Beni 1249/6503
MARU, 1963, designation for km 5 on road from Puerto Siles to San Joaquín, coordinates are as measured from Puerto Siles.

COBIJA; Pando 1102/6844 (USBGN)
On "Rio Madeira"; the alleged origin of a specimen of *Saguinus imperator* (Hershkovitz, 1977: 684); Hill (1957: 237), as Colija; Freese, 1975, as 1110/6858; Heltne et al. (1976: appendix I; 20 to 25 km west of Cobija on río Acre, 1100/6845; on foot between Espirito Santo, 1100/6858, to río Nareuda, at 1120/6900; and on río Acre from Espírito Santo to Buenos Aires, at 1120/6900); Swing, Feb. 1982; D. Lopez for MNLP, no date; see also Tahuamanu; 10 km S of Cobija (1108/6844); Harada, Aug. 1984; Iseki et al. (1985).

COCABOMBA N.L.
J. Steinbach, June 1920, Aug. 1921, Dec. 1928; on río Tajajos.

COCAPATA; Cochabamba 1731/6517
Kessler, Aug. 1991, 3200 m, above Cocapata on Cochabamba to Santa Cruz road (1730/6516).

COCAPUNCO; La Paz 1530/6829 (Tate fieldnotes)
Tate, Mar. 1926, 3100 m, "on trail from Sorata to Mapiri via Ingenio," also "road from Cocopunco to Pararani"; Anthony (1926: 2), type locality of *Thomasomys oreas*. Hershkovitz (1959b: 45), type locality of *Mazama chunyi* (= *M. bricenii chunyi*).

COCHABAMBA; Cochabamba 1724/6609 (USBGN)
Simons, Apr. 1901, at 2400 m and at 2600 m; J. Steinbach, at 2700 m (Hershkovitz, 1962: 248); Thomas (1902a), type locality of *Akodon varius*

(p. 134), at 2400 m, and of *Conepatus porcinus* (p. 128, = *Conepatus chinga rex*); Collins-Day Expedition, 1915 (Osgood, 1916: 199); F. Steinbach, Dec. 1928, Aug. 1929, July 1936; EBD party, Sept. 1985, 15 km E of (1724/6559); Cabot, Sept. 1988, at Country Club, 2560 m, near Cochabamba; Szwagrzak, Nov. 1985, owl pellets; Serrano, 1986, owl pellets; Kessler, Aug. 1991, km 79 on Cochabamba to Oruro road (coordinates unknown); capital city of department.

COIMBRA; Brazil 1129/6518 (RON)
Used to designate places in Beni opposite Coimbra (1129/ 6519) and 5 km SE of Coimbra (1131/6517) AMNH, July 1965.

COLCHANI, EL; Potosí 2020/6656
EBD party, Nov. 1982, entre Colchani y Uyuni (2024/6653).

COLINA CACHAPA; La Paz 1640/6800
Mercado, Feb. 1987, Feb. 1989.

COLLANA; La Paz 1638/6858 (Yoneda, 1984b)
Baudoin, Aug. 1968; Yoneda, Apr. 1983, 3750-3800 m.

COLOMI; Cochabamba 1721/6552 (USBGN)
F. B. Steinbach, Jan. and Aug. 1928, 3800 and 4000 m, June, July, and Dec. 1936, 3075 m, Dec. 1941; 5 km N of (1718/6552); 1993 expedition; 13 km N of, 3125 m ; Poseidon Resort, 12.5 km N of, 3200 m (1713/6553, GPS data); 16.5 km NW of, 3500 m (1714/6557).

COLONIA PIRAY; Santa Cruz 1620/6339
Minezawa et al. (1985), *Alouatta*.

COLORADA, LAGUNA; Potosí 2217/6747 (USBGN)
Walcott, Feb. 1924, 4196 m.; EBD party, Sept. and Nov. 1982; AMNH-MSB, Sept. 1986, 21 km by road SE of ENDE camp, 4500 m (2218/6744), 7 km E of ENDE camp, 4280 m (2210/6745), 2 km E of ENDE camp (2210/6742); Salazar, Oct. 1989, 1 km E of Campamento Sol de Mañana II, (2210/6743), 22.5 km E of ENDE camp (2210/6730).

COLORADO, CERRO; Santa Cruz 1927/6221
Ibáñez, Sept. 1986, hacienda on río Parapeti.

COLORADO, EL; Chuquisaca
EBD party, Nov. 1982, near Villa Abecia (2100/6523).

COLORADO, RÍO; La Paz 1547/6717
Mann, Sept. 1921.

COMARAPA; Santa Cruz 1754/6429 (USBGN)
F. B. Steinbach, Sept. and Oct. 1926, at 2500 m, as Comparapa (USNM); Pearson, Sept. 1955, 5 mi. W of (1754/6434), 7500 ft (= 2310 m); Crossin, Mar. 1973, 28 km W of (1751/6440), Dec. 1972, 30 km W of (1751/6440), in Cochabamba; Schmitt and Cole, Feb. 1979, 6 km S and 10 km E of (1757/6424), in río Pulquina Valley, Propiedad Bado Hondo, 1527 m; Anderson, Nov. 1979, 13 km SE of, by road (1758/6425); Creighton, Feb. 1980, in the Siberia cloud forest, 25 km (by road) W of (1751/6440), 2800 m, in Cochabamba, originally judged to be in Santa Cruz; Cabot, July 1982, Mar. 1983, 11 km [by road] W of, at Churo Negro (1755/6433), 2180 m; EBD party, Mar. 1983, 3 km NW of Churo Negro (1751/6440); EBD party, Nov. 1983, 30 km W of (1751/6441); AMNH-MSB party, Sept. 1984, 31 km (by road) W of, 2800 m (1751/6442), in Cochabamba; 28 km by road W of, 2800 m (1751/6440), in Cochabamba; Myers and Patton (1989a: 4), type locality of *Akodon siberiae*; Hinojosa et al. (1987: 15), type locality of *Oxymycterus hucucha*; 21 km by road W of, 2900 m (1751/6437); 15 km by road W of, 2700 m (1753/6435); 8.5 km by road W of, 2300 m (1754/6432); 1 km N and 8 km W of, 2450 m (1755/6434); 3 km by road SE of, 1700 m (1757/6430); 5 km by road SE of, 1695 m (1758/6429); AMNH and MNK, Nov. 1987, 5 km SW of, 1750 m (1757/6432); 8 km SW of, 1700 m (1758/6433); Glanz and Anderson (1990; 23), type locality of *Abrocoma boliviensis*; AMNH-MSB party, July 1992, 1800 m, 4 km E of (1754/6427).

COMAUCHI; La Paz 1658/6829
BM 13.3.18.1, *Ctenomys leucodon*; EBD party, *Felis concolor*, 1982, on map as Comanche.

CONCEPCIÓN; Santa Cruz1615/6204 (USBGN)
d'Orbigny, 1831; Misión, 490 m; d'Orbigny and Gervais (1847), type locality of *Noctilio affinis* (= *N. albiventris*). Goodfellow, July 1919; Thomas (1921a: 136), type locality of *Ctenomys goodfellowi* (= *C. boliviensis goodfellowi*) is Esperanza (1628/6116), near Concepción. Davis, Mar. 1986 (she gave coordinates as 1608/6202); Nov. 1985, 80 km by road SE of, at Zapocoz (1633/6140); Oct. 1985, 35 km S of, at El Carmen (1625/6200); Szwagrzak, 1980s, year unknown, owl pellets (1615/6204).

CONDO; Oruro 1903/6644
EBD party, Nov. 1982.

CONQUISTA; Beni N.L.
A hacienda; Miranda, 1990 and 1991, in province of Ballivian.

CONSUELO, EL; Beni1420/6715 (Gyldenstolpe, 1945, map)
A. M. Olalla, 1937, 1938; Lönnberg (1939: 17), type locality of *Callicebus modestus*; Lönnberg (1942: 30), estancia on pampas about 12 km E of Reyes; (Patterson, 1992: 5).

COPACABANA; La Paz 1610/6905 (USBGN)
Yepes and Crespo, Mar. 1941.

COPACABANA, *see also* Montero.

CORANI; Cochabamba 1713/6552 (GPS)
June and July 1993, MSB expedition, 2630 m, hydroelectric plant; July, Laguna de Corani, 12.5 km N of Colomi, 3200 m (1714/6553, GPS data).

CORDILLERA [RIO GRANDE]; Santa Cruz
J. Steinbach, 1909 (FMNH).

COROICO; La Paz 1610/6744 (USBGN)
In province of Nor Yungas; Creighton, May 1978, 31 km (1618/6748, on road to La Paz) southward of river crossing near Coroico, 2900 m; S. and R. J. Anderson, May 1982, 1715 m; EBD party, Oct. and Nov. 1982, 4 km from, on road to Caranavi and on right bank of río Coroico (1611/6743); Hinojosa, 1988, 3 km N of, at comunidad Marka (1608/6744).

COSMINI; La Paz 1655/6812 (USBGN)
Simons, Mar. 1901, as 4300 m; Thomas (1902a: 134).

COSTA MARQUES; Brazil 1228/6417 (RON)
Used to designate localities in Beni across the río Iténez, opposite bank (1229/6417), 500 m abajo de (1229/6417), and 40 km by river above town (1232/6403); 4 km above (1229/6415), 1 km above (1228/ 6417); 2 km above (1229/6416); 1.5 km below (1229/6418); 0.5 km S of river and 4 km SW of town (1230/6418); AMNH, 1964; also spelled Costa Marquez.

COTACAJES, RÍO; Cochabamba 1630/6650
CBF party, Aug. 1992, San Antonio, in province of Ayopaya; Seque Rancho (1635/6645).

COTA COTA; La Paz 1633/6805
MNLP, Nov. 1982; see also La Paz.

COTAGAITA, *see* Catagaita.

COTAPATA; La Paz ca. 1613/6754
Remsen and Cardiff, June 1980, 4.5 km by road WNW of Chuspipata, at 3300 m; Hinojosa, Feb. 1991, at Santa Barbara (coordinates uncertain); Apr. 1992, 4 km N of (1611/6754).

COTOCA; Santa Cruz 1745/6257 (MAPA)
Becerra, Sept. 1966; Flores, May 1985, and Szwagrzak, Oct. 1985, owl pellets; in Province of Ibáñez; MSB party, May 1988 (1746/6258).

CRETA, ISLA DE, *see* Estación Biológia de Beni.

CRUCE VENTILLA; Oruro
AMNH-MSB party, Sept. 1986, 7 km S and 4 km E of, 3450 m (1908/6607).

CRUCES, LAS; Santa Cruz 1746/6321
UAGRM party, June and July 1990; 2 km SW of (1747/6322); 3 km SW of (1747/6322).

CRUS, LA; Beni 1320/6340
An estancia, Flores, Sept. 1983.

CRUZ, LA; Pando 1124/6713
AMNH/MSB, Aug. 1986, 170 m.

CUCHARCA, RÍO; Beni
Bats reported by Barquez (1984a) from Santa Rosa, río Cucharca, 70 km N of Trinidad, date and collector not given. Cocharcas on some maps.

CUCHICANCHA; Cochabamba ca. 1721/6543 (MHA)
Miller and Boyle, 1915, 3400 m; or Cuchacancha.

CUESTA CUCHO; Cochabamba 1715/6545
Olalla, May 1938, 2300 m (Patterson, 1992).

CUEVAS; Santa Cruz 1807/6343
An estancia; de la Barrera, November 1954; AMNH-MSB party, May 1991, 1 km NE of (1811/6344), 1300 m.

CUEVO; Chuquisaca 2027/6332
de la Barrera, July 1955 (Fonseca, 1959).

CUMBRE, LA; La Paz 1622/6803 (USBGN)
Tate, Feb. 1926, 15,200 ft (= 4675 m); the highest point reached by the former La Paz-Yungas railroad; Carriker, Jan. 1935; Sanborn (1950), type locality of *Hesperomys lepidus montanus* (= *Calomys l. carillus*); Mercado and Miralles, 1987.

CUPESI, PUESTO DE; Santa Cruz 2012/6233
EBD party, 1986, donated skins, 98 km S of Cerro Colorado; 40 km [S] of, at Rancho Chico, in Cordillera province.

CURICHE; Santa Cruz 1844/6316 (USBGN)
Río Grande, J. Steinbach, Aug. 1909 (FMNH); de la Barrera, 1955.

CURICHI GRANDE; Santa Cruz ca. 1530/6016 (MAPA)
As "about 15° S., a few miles from Brazilian border," Daveron, May 1932, USNM, about 15° 30′ on Brazilian border, Daveron, Dec. 1935; name means simply 'big swamp.' MAPA uses "Bahia Grande."

CURICHE, RÍO; Beni ca. 1236/6354 (MAPA)
AMNH, July 1964, at mouth of W end of Isla Capim.

CURIRABA, RÍO; Beni 1450/6623
Wilson and Salazar, Sept. 1987 (Wilson and Salazar, 1990: 47); Salazar, July 1988 (1451/6621); also spelled Curiaba or Cureraba; see Beni Reserve.

CURUYUQUI; Santa Cruz 1846/6214
Emmons, Oct. 1991 (Parker et al., 1993).

CUSI, LAS; Beni 1355/6450
Tello, Sept. 1986.

CUTIKHUCHU; La Paz 1608/6807 (GPS)
MSB party, June 1993, 2697 m, or Cuticucho.

CUYAMBUYO; Tarija 2215/6436 (USBGN)
Creighton, Jan. 1980; 4 km (by road) N of (2213/6436), 980 m; 8 km (by road) N of (2212/6436), Hacienda Conzelmann, 1000 m; AMNH party, Aug. 1991, 3 km SE of (2216/6433), 900 m.

Ch, see in list with names beginning with C.

DESAGUADERO, RÍO; La Paz 1634/6902 (USBGN)
Pentland, 1850; Thomas (1911: 256).

DESIERTO; Beni 1342/6732 (Gyldenstolpe, 1945)
Olalla, 1937 (Lönnberg, 1940c); on río Beni, also termed El Desierto.

DOLORES, RÍO; Santa Cruz 1722/6341 (USBGN)
Province of Sara; headwaters of Yapacani, near Buenavista; J. and F. Steinbach (Sanborn, 1932a: 175).

ECUADOR; Beni 1412/6526 (MARU)
MARU, Mar. 1971.

EL, used with names such as Astillero, Choro, Consuelo, etc.

ELE ELE, *see* Mizque, Río.

EL PUENTE; department uncertain N.L.
Tello, July 1986.

EMBOCADA, LA; Beni 1503/6658
Creighton, Nov. 1979, 1 km E, Estancia La Cabaña, 600 m, on some maps spelled as Emboscada.

ENCANTO, EL; Beni, *see* Espíritu.

ENCANTO, EL; Santa Cruz 1436/6042
Cascades; MSB party, July 1990; Emmons, Nov. 1992.

ENGENHO DO CAP. GAMA; Brazil N.L.
"Du rio Guapori." Natterer, 8 Sept. 1826 (Pelzeln, 1883: 18, 104).

ENTRE RÍOS; La Paz
AMNH-MSB party, July 1992, 1000 m, 2 km W of (1539/6726).

ENTRE RÍOS; Tarija 2132/6412 (USBGN)
Carriker, Oct. 1936; Gilmore, July 1943, in Province O'Connor, 1200 to 1300 m; Crossin, Jan. 1973, 25 km NW of (2123/6421); AMNH-MSB party, Aug. 1991, 5 km NNW of (2129/6412), 1600 m.

EPIZANA, Cochabamba, *see* Siberia Cloud Forest.

ERQUIS; Tarija 2128/6448
AMNH-MSB party, July 1991, 2100 m.

ESCOMA; La Paz 1540/6908
EBD party, Nov. 1984, at Lago Titicaca.

ESPEJILLOS; Santa Cruz 1758/6327
Ibáñez, 1986, 10 km W of San Jose, in province of Andres Ibáñez.

ESPERANZA; Beni 1401/6446
Pilleri (1977b: 21), Puesto La Esperanza on río Ipurupuru.

ESPERANZA; Beni 1425/6532 (MARU)
MARU, 1963; Barba, Sept. 1966, 42 km NE of San Joaquín (1251/6436); also La Esperanza, see San Joaquín for another place of this name.

ESPERANZA; La Paz 1749/6847 (USBGN)
4000 m, northeast of Mt. Sahama in province of Pacajes, G. Garlepp, Apr., May, June 1897; Thomas (1898a), type localities of *Conepatus rex* (p. 278, = *C. chinga rex*), *Phyllotis* (?) *garleppii* (p. 279, = *Galenomys garleppii*), *Chinchillula sahamae* (p. 280), *Akodon berlepschii* (p. 281, = *Akodon albiventer berlepschii*, *Cavia niata* (p. 282, = *Microcavia niata niata*); Thomas (1907a: 443), *Viscaccia lutea* (= *Lagidium viscacia cuvieri*); Thomas (1914: 357), *Pseudalopex culpaeus andina*; F. Steinbach, Nov. 1941, at 4200 m (Hershkovitz, 1962: 247); Cabrera (1958: 230) cited as "Esperanza, departamento de Oruro" and (1961a: 496) as department of La Paz.

ESPERANZA; Santa Cruz 1628/6116
Thomas (1921a: 136), type locality of *Ctenomys goodfellowi*.

ESPERANZA; Santa Cruz 1954/6259
Zalles, May 1990, Rancho La Esperanze or Hacienda Nueva Esperanza, 40 km from Charagua.

ESPERANZA; "Tarija," *see* Concepción, Santa Cruz.

ESPÍRITU; Beni 1413/6640
La Estancia Elsner Hermanos "Yacuma" (Hanagarth, 1993: 4); coordinates differ as given by different sources (e.g. Hanagarth, 1993: 4, 1408/6624; Instituto Nacional de Estadistica, 1982: 255, 1413/6640; USBGN, 1412/6640; MAPA, 1413/6640; Aguirre, 1994: 6, 1413/6624; Aguirre and Urioste, 1994: 71, 1413/6624); Hanagarth, Instituto de Ecología, Sept. 1980, May and Aug. 1981; Mendez, Jan. 1986; Salazar and Sarmiento, June 1986; Aguirre, June into Oct. 1992. Thirteen collecting sites within 6 km of the estancia, as follows, vicinity of the ranch, tusecal de Espíritu, islas de bosque Perú, El Encanto, and Don Herbert (all near 1413/6640); tajibal de Perú (1413/6641); isla de bosque Vacia (1413/6639); isla de bosque and tajibal de Espíritu Viejo (1411/6638); islas de bosque El Encanto and Don Herbert (1413/6640); Arroyo Carnaval y Puerto Senda and isla de bosque El Chaco (1410/6640); río Yacuma (1410/6639); "Pastizal" (1413/6640).

ESTACIÓN BIOLÓGICA DEL BENI; Beni 1451/6621
EBD parties, Oct. 1983 to Nov. 1985; 6 km N of Isla de Creta (1445/6621); 5 km N of río Cu-

riraba, Isla de Creta (1449/6621); Isla de Creta, 3 km N of EBB (1449/6621); 60 km E of San Borja on road (1451/6621); Arroyo Aguas Negras (coordinates unknown); AMNH, MSB and IBBA, Aug. 1985; 1 km SW of (at Totaisal, 1451/6621), 6 km E of (at río Matos, 1451/6617); Sarmiento, 1986; also known as Estancia El Porvenir; Cabot et al. (1986); Wilson and Salazar (1989); Mercado, 1987, 15 km N of Porvenir (1443/6621); Miranda, Aug. 1990; Paynter, Oct. 1990; other designations are Estación Biológica Beni and Estación Biológica de Beni; see also Beni Reserve, Florida, Trapiche, Pascana, Campamento 08, Porvenir, Villa Dorita, and Busurucucú.

ESTANCIA, *see* name of the estancia, such as Estancia Bethania.

EUCALIPTUS; Oruro 1735/6731 (MAPA)
Schmitt and Cole, Dec. 1968; 11.2 km S and 0.8 km W of (1741/6731), at 3365 m; 12 km S and 1.6 km E of (1742/ 6730); and 9 km S of (1740/6731); 9 km S and 0.8 km W of (1740/6731); see also Huancaroma.

EVA EVA, SERRANÍA; Beni 1536/6638
Hinojosa, Oct. 1990.

EXALTACIÓN; Beni 1316/6515 (USBGN)
MARU, 1963; AMNH, Sept. 1965, 8 km N of Exaltación (1312/ 6515), on río Mamoré; 2 km S of (1317/6515); 7 km S of (1319/6516).

FIERROS, LOS; Santa Cruz 1430/6110
EBD party, Aug. 1986, 450 m, 2, 3, 3.5, 4, or 5 km N of, at Campamento Precámbrico (1432/6054); MSB party, June 1990, 3 km E de Campamento "Los Fierros" (1433/6052); MSB party, July 1991, 3 km S of (1434/6053); 4 km S of (1434/6053); 6 km S of (1434/6053); 7 km S of (1435/6052); 17 km S of (1433/6049); 23 km S of (1438/6045); 27.5 km S of (1438/6044); 52 km S of (1445/6035); see also Florida and Moira.

FILADELFIA; Beni 1259/6453 (MARU)
MARU, 1963.

FLOR DE ORO; Santa Cruz 1535/6034
MNK party, Sept. 1991, 187 m, Parque Nacional "Noel Kempff Mercado."

FLORIDA, *see* Pitiguaya.

FLORIDA; Beni 1451/6621
Cabot, June 1985; Miranda, Aug. 1990, an estancia or hacienda near EBB.

FLORIDA; Santa Cruz N.L.
Delgadillo, Aug. 1950, near Floripondio, or near Agua Hedionda.

FLORIDA, LA; in La Paz, *see* Pitiguaya.

FLORIDA, LA; Santa Cruz 1436/6111
Village on río Paragua; Ibáñez, Aug. 1986; 50 km E of (1436/6047); 38 km E of (1436/6054 = Los Fierros); Braza and García (1988) observations of primates at various localities from La Florida to 60 km E thereof.

FLORIPONDIO; Cochabamba 1804/6445
de la Barrera, Feb. 1955 (Smit, 1987: 350).

FORESTAL, LA; Santa Cruz N.L.
MNK party, Apr. 1990, Florida province [or Andrés Ibáñez].

FORTALEZA; Beni 1412/6528 (MARU)
Webb, Feb. 1971 and Nov. 1972, 95 km S of Santa Ana, in Yacuma province.

FORTÍN CAMPERO; Tarija 2255/6418 (MAPA)
Carriker, Sept. 1936, 350 m.

GENERAL PÉREZ, *see* Pérez.

GLAVIR; Beni 1451/6610
An estancia, 65 km on road from San Borja to Trinidad; EBD party, Oct. 1985; adjacent to EBB.

GRANDE, RÍO; Santa Cruz 1551/6439 (USBGN)
d'Orbigny, June 1831, at ca. 1745/6245 and ca. 1845/6415 (d'Orbigny, 1846: 162); J. Steinbach, Sep. 1909, ca. 1855/6320; Miller, Oct.–Nov. 1915 (perhaps near 1850/6416; Miller, 1918: 344); Steinbach, Oct. 1942, at Bajo Río Grande, 1000 ft AMNH, Aug. 1965, 5 km NW (some specimens were erroneously labeled 4 km NE and some as 5 km NE) mouth of río Grande, on río Mamoré (1550/6441), in Beni; Humberto Montero, Dec. 1988 (1740/6245).

GRANJA, LA; Beni 1318/6409
Webb, Apr. 1970; Kunz, July 1971; Pine (1975: 321), type locality of *Monodelphis kunsi*, W bank of río Itonamas, 4 km N of Magdalena.

GUADALOUPE; Santa Cruz 1833/6405 (USBGN), 1827/6406 (MAPA)
Marzana and Macchiavello, May 1949, 1800 m; as Guadalupe, 10 km S of Vallegrande.

GUALEVA; Beni N.L.
Kuns, Feb. 1972; in province of Iténez.

GUANACOS; Santa Cruz 1849/6309 (USBGN)
J. Steinbach, Sept. 1915, in Cordillera province; MCZ no. 26948, see also Campo de Guanacos.

GUANAY; La Paz 1528/6752 (USBGN)
Tate, Apr. 1926, 1800 m, "small, neatly laid-out village at junction of R. Tipuani and the Mapiri," also "road from Guanay to Carahuarani, 1800–3000 m"; Carriker, Aug. 1934, 460 m; Creighton, June 1978, 5 km (by road) SE of, on río Challana (1530/6750), 1100 ft; 20 km NNE of (1518/6748); also spelled Huanay.

GUAPORÉ, RIO; *see* Iténez, río.

GUARAYITOS; Santa Cruz1735/6146 (USBGN)
Kreig, 1926.

GUARAYOS; Santa Cruz 1614/6037 (Hershkovitz, in litt.)
"Province in Santa Cruz"; d'Orbigny (1834: 89), type locality by restriction (Elliot, 1913) of *Callithrix boliviensis* (= *Saimiri sciureus boliviensis*), as Sierras Guarayas; d'Orbigny (1837: plate 9), type locality of *Noctilio rufipes* (= *Noctilio leporinus rufescens*), as río San Miguel, Llanos de Guarayos; at present there is no province of Guarayos in Santa Cruz. See also Ascensión de Guarayos. Pilleri and Arvy (1977) mapped San Miguel at 1619/6026.

GUARINA, *see* Huarina.

GUARIPEMBI, *see* Guirapembi.

GUAYARAMERIN (Puerto Sucre); Beni 1049/6525 (MAPA)
AMNH, 1964, 1965; 2 km N of, on island (1048/6525); 1.5 km N, on island in río Mamoré (1048/6525); 1.5 km NW of (1048/6526); 4 km S of (1051/6525); 5 km S of (1052/6525); Fugler and Swing, Feb. 1982; Tello, July 1986.

GUAYARAMERIN AND GUAYARA ASSU, CACHUELAS; Beni 1045/6525 (RON)
Natterer, 1829 (Pelzeln, 1883: 127) as Cachoeiras Guayara mirim and guacu.

GUIRAPEMBI; Santa Cruz 1926/6231
EBD party, Sept. 1986, on río Parapetí, in province of Cordillera, as 1930/6730.

GUTIERREZ; Santa Cruz 1925/6334 (USBGN)
de la Barrera, July 1955 (Smit, 1987: 350). Becerra and Acasigue, Sept. 1966, in province of Cordillera; Schmitt and Cole, Jan. 1979 and Feb. and Apr. 1984, 10 km E of, at Laguna Caucaya (1925/6329), 875 m.

HABANA; Beni 1410/6449
An estancia, Pilleri, 1976 (Pilleri, 1977b: 21).

HACHA, *see* Jhacha.

HAMACAS; Santa Cruz 1744/6311 (USBGN)
Silva, July 1938, also spelled Hamecas.

HAMBURGO, *see* río Beni.

HARDEMAN; Santa Cruz 1620/6340
Harada, Sept. 1984.

HENEY, RÍO N.L.
Pine and Wetzel (1975).

HERBERT, DON; Beni, *see* Espíritu.

HORCUS; Chuquisaca 1929/6433 (USBGN)
Prince, March 1965, 80 km SE Sucre, or Horcas (USBGN, MAPA).

HORQUILLA; Beni 1234/6425 (MAPA)
MARU, 1963; AMNH, Sept. 1964, 15 km above Horquilla, on río Machupo (1241/6432); 20 km above Horquilla, on río Machupo (1243/6435).

HOSÁNE, CERRO; Santa Cruz N.L.
1200 m, J. Steinbach, Aug. 1917; Tate (1933: 75) as Cerro Hosana.

HOYADA, *see* Vallegrande.

HUACARAJE; Beni 1333/6345 (USBGN)
MARU, 1963; Acasigue, Nov. 1966, in Iténez Province; also spelled Huancaraje.

HUACHI; La Paz 1540/6715 (USBGN)
Mann, "1921–2" (USNM); also known as San Miguel de Huachi, on río "Boki" [= Bopi].

HUACULLANI; La Paz 1627/6845 or 1658/6850?
Instituto de Ecología, Feb. 1979.

HUAJCHILLA; La Paz 1637/6803 Yoneda, 1984
Instituto de Ecología, Yoneda, Feb. 1982 to Feb. 1983, 3050 m; Mercado, Feb. and May 1982, 4 km SW of (1639/6805); EBD parties, Sept. and Oct. 1982, Oct. 1984.

HUAKARANI: perhaps in Oruro N.L.
Pujol, April 1969, "Departamento d'Urumo"; specimens in Paris, see *Microcavia*.

HUANAY, *see* Guanay.

HUANCARAJE, *see* Huacaraje.

HUANCAROMA; Oruro 1739/6731 (MAPA 1980)
Baudoin, Aug. 1968, Mar. and Apr. 1971, ranch near Eucaliptus; AMNH-MSB, Aug. 1984, 3720 m (1740/6729); 1 km W of, 3730 m (1740/6730); 2.5 km NE of, 3720 m (1739/6728); 3.5 km E of, 3720 m (1740/6727); 1 km E and 3 km S of, 3720 m (1742/6728); AMNH-MSB party, Oct. 1986, (1740/6729), 3.5 km E of (1740/6727, 1 km W of (1740/6730); 3 km W of, río Desaguadero (1740/6732).

HUANCASAYA; La Paz N.L.
Villalba, Feb. 1990, prov. Franz Tamayo.

HUANCHACA, SERRANÍA; Santa Cruz 1425/6050
EBD party, Aug. 1986, or Serranía Caparus.

HUANCUNI; La Paz 1544/6835
Olalla, July 1938, 3050 m (Patterson, 1992).

HUANDA; Santa Cruz N.L.
MNK party, 1990, in province of Andrés Ibáñez; see Wendá.

HUANUNI; Oruro 1816/6651
Anderson and Olds, July 1983, at 4150 m; 3 km E [or NE] of (1815/6648).

HUARACO; La Paz 1710/6755 (Yoneda's notes)
Instituto de Ecología, June, Nov., and Dec. 1980; Jan., May, Aug., Sept., and Nov., 1981; Feb. 1982; Peñaranda, Jan. 1991 (as 1722/6738) and June 1991, as Huaraco-Antipampa (1727/6737); Kessler, Aug. 1991, 3700 m (1710/6755).

HUARI; Oruro 1900/6645

AMNH-MSB party, Sept. 1986.

HUARINA; La Paz 1612/6838 (USBGN)

Simons, Aug. 1900, at 4000 m; Thomas (1911b: 255), type locality of *Kerodon auceps* (= *Galea musteloides auceps*); as Guarina.

HUARINILLA, RÍO; La Paz 1611/6744

CBF, early 1990s.

HUARMECHI; Tarija 2127/6505

Skin of *Felis jacobita* from hunter, 1991, 3300 m.

HUATAJATA; La Paz 1612/6842

Niethammer, Nov. 1951.

HUCHULA; Beni 1252/6422 (MARU)

USNM no. 461038, Apr. 1970.

HUCUCHA N.L.

Specimen of *Akodon albiventer* in São Paulo (Vanzolini, in litt.); hucucha is the Quechuan word for mouse, so this may not be a locality name at all.

HUERRASCA; Beni 1317/6438

MARU, Mar. 1965, Feb. 1967, 10 km E of San Ramón.

HUESOS, LOS; Santa Cruz N.L.

Marzana and Macchiavello, Apr. 1949, in Cordillera Province, 900 m.

HUMAHUACA; Argentina

Cornalia (1865: 3), type locality of *Felis jacobita* "circa Potosi et Humacuaca in montibus sat elevatis"; this may refer to Humahuaca in Jujuy, Argentina, in which case the type specimen might have come from either Argentina or Bolivia.

HUMAITA; Pando 1203/6817 (MAPA 1980)

Flores, Sept. 1985.

IBÁÑES, *see* Santa Cruz de la Sierra.

IBARE, RÍO; Beni 1437/6457 (USBGN)

AMNH, June 1965; 1 km above mouth (1438/6457); 24 km from mouth (1446/6451); 26 km from mouth (1447/6451); 27 km from mouth (1447/6451).

IBIETO; Beni 1448/6418

Townsend, Mateo, Mendoza, and others, various months from Mar. 1991 through Apr. 1992; also spelled Ibiato or Eviato.

IBOPAITI; Chuquisaca 2001/6350 (USBGN)

Kreig, 1926, as Ibopeite.

ICHILO, RÍO 1557/6442 (USBGN)

Delgadillo, Nov. 1950, near Buen Retiro; on boundary between Cochabamba and Santa Cruz at the point given by Paynter et al. (1975: 28); AMNH, July 1965, 13 localities on río Ichilo, most measured as distances below (north; the river is the río Mamoré if the Chapare and Ichilo are regarded as merging to form the Mamoré) or above (south) mouth of río Chapare, two measured below (north) mouth of río Chimoré, those on left bank in Cochabamba, those on right bank in Santa Cruz; right bank, 5 km N of mouth of Chapare (1555/6442); right bank, 2 km N of mouth of Chapare (1557/6441); left bank, 2 km N of mouth of Chapare (1557/6442); left bank, at mouth of Chapare (1558/6442); right bank, 9 km S of Chapare (1603/6442); right bank, 34 km S of mouth of Chapare (1617/6442); right bank, 51 km S of mouth of Chapare (1627/6444); left bank, 51 km S of mouth of Chapare (1627/ 6445); right bank, 52 km S of mouth of Chapare (1628/6444); left bank, 52 km S of mouth of Chapare (1628/6445); right bank, 54 km S of mouth of Chapare (1629/6444); right bank, 56 km S of mouth of Chapare (1630/6445); right bank, 70 km S of mouth of Chapare (1636/6448); right bank, 27 km N of mouth of Chimoré (1627/6444); left bank, 27 km N of mouth of Chimoré (1627/6445); right bank, 2 km N of mouth of Chimoré (1642/6449); see río Chapare; Pilleri, Nov. 1976 (1977: 16), at Vita Lei, a farm near Puerto Villarroel (1648/6447).

ICHILO PROVINCE; Santa Cruz

F. Steinbach, June 1924, June 1945.

ILLATACO; Cochabamba 1720/6607

Olalla, Dec. 1938, 2600 m (Patterson, 1992).

ILLIMANI; La Paz

Hartmann, 1978, south slope of Nevado Illimani at 1637/6748.

INCACHACA; Cochabamba 1714/6541 (USBGN)

Miller and Boyle, May 1915, 7700 ft (= 2370 m); J. and F. B. Steinbach, Sept. 1921, May, June, and Sept. 1927, 2225 m, 2600 m and 3000 m; Anthony (1925: 2), type locality of *Thomasomys daphne australis*; Carriker, May and June 1937, 2130 to 2440 m, Doutt (1938: 100), type locality of *Monodelphis peruvianus osgoodi* (= *Monodelphis osgoodi*); Cabot, Aug. 1988, near Locotal, spelled as Inkachaka (1700/6610), 2250 m.

INDEPENDENCIA; Pando 1126/6734

AMNH-MSB, July and Aug. 1986; 170 m; at recent settlement on left bank; also right bank of río Madre de Dios, opposite Independencia.

INGAVI; Pando 1057/6650

RAP team, June and July 1992, 150 m, barraca (= small settlement) on N bank of río Orton, in Provincia Abuna.

INGAVI, *see* Villa Ingavi, Tarija.

INGENIERO MORA; Santa Cruz 1810/6316

Straney, Dec. 1979 and Jan. 1980, Los Tabijos [a misspelling of Tajibos], 2 km N and 7 km E of (1809/6312); 10 km E of (1810/6311); Pine and Remsik, August 1980, localities 15 km E of

(1810/6308), at 1600–1900 ft (= 490—580 m) and 7 km E and 3 km N of (1808/6312), same elevation.

INQUISIVI; La Paz 1652/6708
CBF party, Aug. 1991, 2500 m.

IPATI; Chuquisaca 2033/6326
de la Barrera, 1955 (Fonseca, 1959: 93); EBD party, Nov. 1984, 81 km from (1954/6346), at Mullupampa or Vaca Guzmán, "hacia Monteagudo, Pasado Mullupampa, junto al río Iñao o Parapetí, Prov. Luis Calvo."

IPUNO; department uncertain N.L.
A. Fornes, Mar. 1969, specimen at TTU.

IPUROPURO, RÍO; Beni 1347/6438 (USBGN)
Pilleri, Dec. 1976, at Estancia La Havana (1410/6449; Pilleri, 1977b: 21); (Pilleri and Pilleri, 1984), as Ipurupuru; on some maps as Irurupuro.

IRUPANA; La Paz 1628/6728 (USBGN)
Mercado, July 1986, 2120 m; Mendez, Apr. 1987; Hinojosa, Salazar, and other students, Jan. 1988, and 2 km S of and 3 km S of (1630/6728), 2135 m; in province of Sud Yungas.

IRUPLUMO, RÍO; Beni
CBF party, May 1992, tributary of Sécure, at mouth of Iruplumo (1601/6615).

ISAMA, RÍO; Santa Cruz 1727/6351 (USBGN)
Crespo (1959: 10), F. Steinbach, May–June 1943 at 420 m, in province of Ichilo (FMNH; also in Buenos Aires, R. M. Wetzel, personal commun., as Isamo or Isamé).

ISCAYACHI; Tarija 2129/6458 (MAPA)
Pearson, Dec. 1971, 12 mi NW of (2121/6506), 10,000 ft (= 3075 m); AMNH-MSB, Sept. 1986, 1 km E of, río Tomayapo, 3450 m (2129/6457); AMNH-MSB party, July 1991, 1 km E of (2129/6457), at río Tomayapo, 3416 m; 4.5 km E of (2129/6455) 3750 m.

ISIAMAS, *see* Ixiamas.

ISIBOBO; Santa Cruz
An estancia; AMNH-MSB party, July 1991, 1 km S and 3 km W of (1931/6336), 930 m.

ISIBORO, RÍO 1528/6505 (USBGN)
d'Orbigny, 1835, as Isibara.

ISLA DE LA LUNA: La Paz 1603/6904
CBF party, Apr. 1992.

ISLA DEL SOL; La Paz 1601/6910 (MAPA 1980)
Libermann, 1986; Bernal, Apr. 1992

ISLA GARGANTUA; Pando 1223/6835
Maps are inconsistent, some show it as in La Paz department. Harada, 1984; Iseki et al. (1985); AMNH-MSB, July 1986, across the north channel of río Madre de Dios from town of Chivé.

ITACHEBA; Cochabamba N.L.
CM 5080.

ITAHUATICUA, CERRO; Santa Cruz 1948/6331
AMNH-MSB party, July 1990.

ITAN, *see* Itau.

ITAU; Tarija 2142/6354 (USBGN)
Budín, Sept. 1924, at the foot of a range of hills, the Sierra Santa Rosa, near Itau, at about 1600 m; Thomas (1925), type localities of *Rhipidomys collinus* (p. 578, = *R. leucodactylus collinus*) and of *Cavia tschudii pallidior* (p. 580, = *C. t. sodalis*); Cabrera (1961a: 421) as Itan.

ITÉNEZ; see Magdalena.

ITÉNEZ, RÍO; Beni 1155/6504 (USBGN)
AMNH, Oct. 1965, about 20 km above mouth (1200/6502); Guaporé is the Brazilian name for this river.

ITONAMA, RÍO; Beni 1228/6424 (USBGN)
Natterer, 1829 (Pelzeln, 1883: 127); d'Orbigny, Mar. 1832.

IXIAMAS, La Paz 1345/6809 (USBGN)
Mann, 1922; Eger (1974: 4) cited for *Eumops auripendulus*, USNM; sometimes spelled Isiamas, or Xiamas; Freese, 1975, as 1340/6810, 221 m; Heltne et al. (1976: appendix I; on foot from 1333/6805 to approximately 35 km N of Ixiamas at 1345/6807; and from 1345/6810 to 5 to 10 km W of Ixiamas); 35 km N of (Hershkovitz, 1984), 1340/6810; Yoneda and Sarmiento, July and Aug. 1990, Aserradero San Francisco (1333/6800); Emmons, June 1990, about 13 km SW of, 400 m, on río Satariapo (1353/6815); Smith, May 1993, 25 km W of, on road to Alto Madidi (1353/6821).

IZOZOG; Santa Cruz 1924/6245 (USBGN)
Wavrin, May 1921; Davis (1966: 267); 550 m; at Gamachindy (= Tamachindi, 1927/6232).

JACHA KHACA; Oruro 1809/6859
CBF party, Nov. 1992, 4800 m, S of Sajama.

JAMACHUMA; Cochabamba
MSB expedition, July 1993, 1.3 km W of, 2800 m (1732/6607, GPS).

JAPACANÍ, RÍO; *see* Yapacaní.

JARIMAYO, RÍO; *see* Totora.

JERUSALEN; Beni 1543/6444 (USBGN)
AMNH, July 1965, as Jerusaleum; 2 km N of (1542/6444).

JESUS DE MACHACA; La Paz
AMNH-MSB, Oct. 1986, 3850 m, 12 km by road SW of (1648/6852).

JHACHA TOLOKO; La Paz 1621/6802
Miralles and Mercado, May and June 1987, 4740 m, several nearby localities at different elevations.

JOYA, LA; La Paz 1538/6819 (USBGN)
Tate, Apr. 1926, a hacienda at the side of the río Kaka that enters the Tipuani on the right.

JUAN LATINO; Santa Cruz 1725/6315
Hibbs, July 1965, 13 km NNW of Warnes.

JUCHILO, RÍO, *see* Ichilo, río.

JULIO, PUERTO; Beni 1448/6457 (USBGN)
AMNH, July 1965, 15 km SE of, on río Mamoré (1453/6453); 17 km SE of (1454/6452); 20 km SE of (1456/6454).

JUNO, CERRO, *see* Tiraque.

KALINA, LAGUNA; Potosí 2237/6710
EBD party, Nov. 1982.

KALUYO, RÍO; La Paz
Yoneda, Apr. 1983, 10 km NNW of La Paz (1625/6807), 4200 m; 20 km NNE of La Paz (1619/6806), 4700 m.

KARI KARI, CERROS DE; Potosi 1939/6540 (USBGN)
Carriker, Jan. 1938, 4725 m, also spelled as Caricari.

KATMANDÚ; Beni 1428/6610
Estancia in province of Yacuma on río Matos, MNLP, 1985, see Camandú, also spelled Catmandú.

KELLHUANI, LAGUNA; La Paz 1622/6807
Miralles, June 1987, near Chacaltaya, province of Murillo, 4820 m, or Kellguani.

KHALLUTAKA; La Paz 1630/6814 (personal obs.)
Instituto de Ecología, at Experiment Station, Jan. 1979, also spelled Kallutka.

KHASTOR; Potosí 2214/6659
Campamento, MNLP party, June and Dec. 1989, 4600 m, 1 km NW of Laguna Khastor.

KHUÑUMA; La Paz 1634/6810
Mercado, Mar. 1987, 3600 m.

LA, used with names such as Abra, Cabrada, Crus, Cumbre, Florida, etc.

LADERA; Santa Cruz 1827/6356
de la Barrera, Nov. 1954 (Hopkins and Rothschild, 1966: 136).

LAGO; used with names such as Titicaca and Victoria.

LAGOINHA; Beni 1153/6506 (MAPA)
AMNH, May 1965, 7 km N of Lagoinha (1149/6506) on W bank of río Mamoré across from the mouth of the río Iténez; as Logoinha in USBGN and on MAPA.

LAGUNA, *see* under names such as Colorado, Pajaral, and Nuve.

LAGUNA, LA; Beni 1425/6704 (Gyldenstolpe, 1945)
Olalla, 1938, on río Beni, una legua de Santa Rosa; Lönnberg (1939: 16), type locality of *Callicebus olallae*.

LAGUNA, LA; Santa Cruz 1636/6241
EBD party, July, Aug., and Nov. 1983, as Finca La Laguna, 9 km N of San Ramón (Ibáñez, 1985: 330); see also San Ramón.

LAGUNA I & II; Tarija
Eisentraut (1933: 48) near Villa Montes.

LAGUNAS; Oruro 1813/6858 (USBGN)
C. G. Schmitt and D. C. Schmitt, Dec. 1984, 6 km NE of, in foothills of Nevado Sajama, 4250 m (1810/6855); CBF party, 1992, 3 km NE of Pueblo, 4160 m (1813/6855).

LAGUNILLAS; Cochabamba 1650/6638 (USBGN)
Gilmore, 1942, "near Lagunillo and Tocorani," skulls of *Tremarctos* picked up.

LAGUNILLAS; Potosí 1930/6523 (USBGN)
Simons, Sept. 1901, at 3500 or 4000 m; Thomas (1902b: 226), type locality of *Akodon spegazzinii* (= *A. boliviensis spegazzinii*).

LAGUNILLAS; Santa Cruz 1938/6343
de la Barrera, July 1955.

LAHUACHACA; La Paz 1723/6740 (ACB)
Mercado, 1982.

LAJAS, CACHUELA; Beni1026/6523 (USBGN)
Natterer, 4 Sept. 1829 (Pelzeln, 1883: 127) as Cachoeira do Lage.

LAKE BALZON, *see* Balzon.

LA PAZ; La Paz 1630/6809 (USBGN)
d'Orbigny *in* Geoffroy Saint-Hilaire and Blainville (1834: 91), type locality of *Cervus antisensis* (= *Hippocamelus antisensis*) is Andes of Bolivia near La Paz; Gervais and d'Orbigny (1844: 22), type locality of *Octodontomys gliroides* also is Andes of Bolivia near La Paz; Simons, Aug. 1900, Feb. and Mar. 1901; Ortun, prior to 1902, Cordilleras of La Paz; Thomas (1902a: 135) type locality of *Akodon pacificus*; Tate, 2 May 1926, altiplano between Sorata and La Paz (locality not specific); Doello and Jurado, Mar. 1933; Pearson, Sept. 1955, 20 mi S of (1647/6809), at 13,000 ft (= 4000 m); Schmitt, July 1979, 2 km (by road) S Mallaca (1637/6805), (near La Paz along road S of Calacoto), 3200 m; capital of department; Instituto de Ecología, Jan. 1979, at Cota Cota (1633/6805); EBD party, Jan. 1982, río Calacoto, near La Paz (1632/6806); MNLP, at Cota Cota, Jan. 1984; MNLP, at Calacoto, Apr. 1984 (1632/6806); AMNH-MSB, July 1985, at Cota

Cota, 3300 m; Instituto de Ecología, Mercado and Miralles, Sept. 1986, 1987, Avenida del Poeta (1630/6809); Mercado, 1987, El Alto (1631/6810); Mercado, Nov. 1988, Tembladerani (1631/6809).

LARAM-KKOTA, LAGUNA; La Paz 1622/6808
Miralles, Oct. 1986, province of Murillo, near Nevada Chacaltaya, 4510 m.

LARANGEIRAS; Brasil 1313/6209 (MAPA)
AMNH, Aug. 1964, used to designate Bolivian locality of Bahía de los Casara, 20 km W of Larangeiras (1313/6221).

LAS; used with names such as Barreras, Cusi, Piedras, etc.

LAVI GRANDE; La Paz 1626/6728
CBF party, Oct. 1992, Campamento Qhana, 6 or 7 km S of Irupana.

LAZA; La Paz 1625/6726
Olalla, Oct. 1938, 2100 m (Patterson, 1992: 5).

LEIGUE, PUERTO; Beni 1416/6453 (USBGN)
AMNH, June 1965; on W bank, 5 km N of (1412/6454).

LIMANI, LAGUNA; La Paz 1626/6808
Mercado and Miralles, Oct. 1986, province of Murillo, 4080 m.

LIMÓN, RÍO; Chuquisaca 1933/6408
AMNH-MSB party, Aug. 1990, 1300 m.

LIMOQUIJE; Beni 1526/6448 (USBGN)
AMNH, Aug. 1965, ca. 5 km SE of (1528/6446); 15 km S of (1534/6446), also spelled Limoquique.

LINARES, PUERTO; La Paz 1529/6730 (IGM)
Webster, July and Aug. 1979, 1 mi W of (1529/6731); Remsen, 1981, 20 km by river N of (1517/6737); Yoneda, July 1983, 520 m (1527/6728).

LIOMIL; Brasil N.L.
Natterer (Pelzeln, 1883: 61); in Terr. do Guaporé, now Rondônia.

LIPEO, RÍO; Tarija 2241/6426 (USBGN)
Carriker, Aug. and Oct. 1936, 2100 ft (= 640 m). Paynter et al. (1975: 34) gave the above coordinates of Carriker's location.

LIPEZ; Potosí, *see* San Antonio de Lipez.

LIRA; Santa Cruz N.L.
MNK party, 1990, province of Andrés Ibáñez.

LIRIANI; Cochabamba 1719/6620
Olalla, Nov. 1938, 3000 m, or Liriuni (Patterson, 1992).

LIVICHUCO; Potosí 1853/6628 (USBGN)
Simons, Aug. 1901, at 4500 m; Thomas (1902b: 227) as Livicucho.

LLALLAGUA; Potosí 1825/6638 (USBGN)
Carriker, May 1936, 13,500 ft (= 4200 m).

LLAMACHAQUE; La Paz N. L.
Bernal, June 1995, 3150 m; near Pelechuco (1448/6904).

LLANTOCSILLAS; Chuquisaca 1905/6424
Cors Medina, 1941–1942; in province of Tomina, near Villa Serrano, 2200 m.

LLATHU PAMPA; Cochabamba
AMNH-MSB party, June 1991, 0.5 km S of (1745/6459), 2500 m; also spelled Lluthu.

LLICA; Potosí 1952/6816 (USBGN)
Carriker, Feb. 1938, 3700 m, in province of Nor Lipez.

LOCOTAL; Cochabamba 1711/6548 (USBGN)
Miller and Boyle, May 1915, at 5800 ft (= 1785 m); Olalla, Apr. 1938, 1850 m (Patterson, 1992); F. Steinbach, Jan. 1940, at 1650 m; F. Monres, Jan. 1958, Yungas de Locotal; Cabot, Sept. 1982, as "antes de Sillar."

LOMA ALTA; Pando 1058/6611
Graffin, June 1987.

LOMAS DE ARENA; Santa Cruz 1753/6249
Tapia, Aug. and Oct. 1989; also La Loma.

LOMITAS, *see* Santa Cruz de la Sierra.

LOPEZ MENDOZA; Cochabamba 1732/6523 (MAPA)
Schmitt and Schmitt, Aug. 1984, 6.6 km by road NW of (1728/6527), at km 98 from Cochabamba, Quebrada Majon, 3300 m.

LORETO; Beni 1513/6440 (USBGN)
AMNH, Aug. 1965, 15 km W of (1515/6455).

LOS; used with names such as Huesos, Palmares, Totumu, etc.

LOURDES, MINA; La Paz 1619/6758 (GPS)
AMNH-MSB party, Aug. 1992, "3600 m" [= 3800 m].

LUCA; Oruro 1936/6753 (ACB)
Mercado and Miralles, May 1986.

LÚCUMA; Beni 1329/6445 (USBGN)
MARU, ca. 20 km or 6 leagues S of San Ramón, also spelled Lacuma; Yates and Salazar, Mar. 1993, as Lúcumo and 45 km S of San Ramón (1343/6437).

LUNA, *see* Isla de la.

Ll, *see* in list with names beginning with L.

MACHACA, *see* Jesus de Machaca and San Andres de Machaca.

MACHACAMARCA; Oruro 1810/6702 (USBGN)
Anderson, Oct. 1979, 3700 m, 11 km N of (1804/6702).

MACHARET; Chuquisaca 2049/6324 (USBGN)
Anderson, Oct. 1979, 10 km N of (2043/6324), 660 m.

MACHARIAPO, RÍO; La Paz 1436/6835
RAP, May and June 1990 (Emmons, 1991).

MACHUPO, RÍO; Beni 1234/6425 (USBGN)
AMNH, Sept. 1964. Also spelled Machupe.

MADIDI, RÍO; La Paz 1232/6652 (USBGN)
Balzan, 1892; AMNH, MSB, and IBBA, Sept. 1985, 8 km above mouth (1234/6700), and Santa Ana de Madidi (1234/6710); AMNH-MSB party, Aug. 1986, Santa Ana de Madidi; Emmons and Hinojosa, May 1990, in province of Iturralde at Moira Camp, 270 m, (1335/6846).

MADRE DE DIOS, RÍO; Pando
Olalla, Nov. 1937, at or near mouth, see Victoria (1059/6610); AMNH-MSB party, July and Aug. 1986, 160 m; left bank opposite Genechiquia, 170 m (1117/6650); left bank, 170 m (1112/6640); left bank, at Cuzco, 5 km upstream from the Monte Verde Cachuelas (1200/6816).

MADRID; Pando, *see* Camacho.

MAGDALENA; Beni 1320/6408 (USBGN)
AMNH, Aug. 1964; Ranck, Nov. 1966 (MARU), Magdalena, 3 km N of Magdalena (1318/6408), and 12 km N of Magdalena on the río Itonamas (1313/6408); MARU, Mar., Apr. and June 1969; Webb, Apr. 1970; Kuns, Jan. and Feb. 1971; LaVal (1973: 11), USNM, at 100 m; Eger (1977: 40) as "Itenez" and 1322/ 6407; SNCFHB, Jan. and Feb. 1985 (Torres et al., 1988); provincia de Iténez.

MAMORÉ; Beni
MARU, 1963.

MAMORÉ, RÍO; Beni 1023/6523 (USBGN)
Elliot (1913, vol. 2: 28); Zischka, 1957, for museum in Munich (R. M. Wetzel, personal commun.); AMNH, June 1964, at 12°26′S (1226/6511), at 12°59′S (1259/6510), 13° (1300/6510), at 13°15′ (1315/6515), at 13°35′ (1335/6520), at 13°50′S (1350/6515), on west side at 13°50′ (1350/6520), at 13°55′S (1355/6520), at 14°00′S (1400/6458), and at 14°31′S (1431/6456); AMNH, Sept. 1965, at 4 km below mouth of río Apere (1342/6519); *see* río Ichilo also.

MANGAL; Beni
USNM; 25 km NW Exaltación (1306/6525), Ykuma province.

MANGAULITO; Santa Cruz N.L.
MNK party, in Parque Nacional "Noel Kempff Mercado"; or campamento Mangaulito.

MANUPARE, RÍO; La Paz 1227/6737
Graffin and Solomon, June 1987, Siete Cielos, 180 m, province of Iturralde.

MANURIPI [province]; Pando
MARU, May 1965, 5 km NW of Riberalta on N bank of río Madre de Dios (1057/6604), 3.5 km NW of Riberalta on NW bank of río Beni (1058/6605), 13 km NW of Riberalta on S bank of río Madre de Dios [in Madre de Dios province] (1053/6612).

MANURIPI HEATH NATIONAL WILDLIFE RESERVE; Pando
Tello, Sept. 1986, camp near 1150/6845.

MAPAISO, RÍO; Santa Cruz 1752/6317 (USBGN)
J. Steinbach, Aug. 1909, 400 m; Hershkovitz (1977: 583).

MAPIRI; La Paz 1515/6810 (USBGN)
Simons, Aug. and Sept. 1900, 750 m, 1000 m, 1400 m; Thomas (1901a: 180), type locality of *Galera barbara brunnea* (= *Eira barbara peruana*); Thomas (1901b), type localities of *Oryzomys boliviae* (p. 536, = *O. nitidus*) and *Proechimys bolivianus* (p. 537, = *Proechimys*, species uncertain); Tate, Mar. and Apr. 1926, 2000 ft (= 610 m); small pueblo at edge of río Mapiri; 1517/6812 (IGM); Creighton, Oct. 1979, 10 km (by road) NW of (1512/6813), 650 m; see also San Ernesto.

MARBÁN; Beni 1540/6420 (USBGN)
F. Steinbach, Feb. 1944, on río Mamoré (1540/6440 approx.), 240 m; province in department of Beni.

MARIMONOS; Beni 1548/6656 (ACB)
IBBA, Jan. to Mar. 1985.

MARKA, comunidad de, *see* Coroico.

MASICURI; Santa Cruz 1848/6346 (USBGN)
C. G. Schmitt and D. C. Schmitt, 14.5 km by road NW of, 1050 m (1845/6353), 13 km by road NW of, 1000 m (1846/6352).

MATEGUÁ; Beni 1301/6248 (USBGN)
AMNH, July 1964.

MATOS, RÍO, *see* Estación Biológica de Beni.

MATUCARÉ, RÍO; Beni 1247/6505 (USBGN)
AMNH, May and Oct. 1965.

MAYOSA, RÍO; Beni 1226/6512 (USBGN)
AMNH, May 1965, at river's mouth.

MECAPACA, La Paz 1640/6801 (Yoneda, 1984)
EBD party, Oct. 1982; Yoneda, Apr. 1983, 2800 m; Miralles, Feb. 1987; Salazar, Oct. 1988.

MEDIDI, *see* Madidi

MEIO; Beni ca. 1230/6415 (MAPA)
AMNH, Sept. 1964, Pampa de Meio, about 6 km above Costa Marques [Brazil]; Pine and Wetzel (1975: 651), type locality of *Pseudoryzomys wavrini reigi* (= *Pseudoryzomys simplex*).

MELOCOTÓN; Tarija N.L.
Budín, Jan. 1925 or 1926, 1700 m; Thomas (1926b: 325), probably between Entre Ríos and Tamba.

MINEROS; Santa Cruz
MSB party, June 1988, 1 km S of (1708/6313); 5 km S of (1715/6313).

MISIONES; perhaps in La Paz N.L.
Balzan (Thomas, 1900c: 139), upper Mamoré drainage.

MIZQUE; Cochabamba 1756/6519 (USBGN)
d'Orbigny, Oct. 1830; d'Orbigny (1847: map); Miller and Boyle, Sept. 1915, 7500 ft (= 2310 m); M. Baudoin, June 1968, 5 km S of (1759/6519).

MIZQUE, RÍO; Cochabamba 1839/6420 (USBGN)
Carriker, Oct. 1937, 10 km S of río at Ele-Ele (1806/6445), "5000 ft" (= 1430 m, MHA).

MOIRA, ASERRADERO; Santa Cruz 1433/6111
or Aserradero Florida; EBD party, Aug. and Sept. 1986, 4 km E of (1434/6110), 7 km E of (1433/6108), 20 km E of (1432/6104), 38 km E of (1433/6053 = Los Fierros); 45 km E of (1437/6048), 50–55 km E of (1438/6044), 60 km E of (1442/6041).

MOIRE; La Paz 1335/6846
Emmons and Hinojosa, May 1990, campamento in Alto Madidi, 270 m, province Iturralde, on río Madidi (1335/6846), also spelled Moira (Emmons, 1991).

MOJÓN; Beni 1321/6345
MARU, 1963, or El Mojón, Orobayaya.

MOJOS, *see* Moxos.

MOKA; Santa Cruz N.L.
Apostol, 1962, as "N. Moka" or Nueva Moka.

MOLINO ZABACAL; Chuquisaca N.L.
PASB, June 1942; see also Zapial.

MONOS; Santa Cruz 1844/6354
de la Barrera, Feb. 1955, 1434 m (Fonseca, 1959: 92).

MONTEAGUDO; Chuquisaca 1949/6359 (USBGN)
Crossin, Nov. and Dec. 1972, 16 km N of, 5000 ft (= 1539 m, ca. 1938/6406), and 72 km ESE of and in Santa Cruz, 4000 ft (= 1220 m, ca. 1959/6318); AMNH-MSB party, July 1990, 2 km SW of (1949/6358); CBF party, 14 km N of, in cañon de Herida, at río Bañado (1939/6406).

MONTE CANTU; Chuquisaca 1931/6409 (USBGN)
Cors Medina, Aug. 1942, between Padilla and the río Azero in province of Tomina; also with name Tomina Chullpar; as Montecanto (USBGN and MAPA); 1700 m.

MONTECARLO; Pando 1132/6803
Minezawa et al. (1989), on south bank of río Manuripi.

MONTEGRANDE; Santa Cruz N.L.
J. Steinbach, June 1918, at Cafeces.

MONTE GRANDE; Beni 1350/ ?
See Trinidad.

MONTE PUNCO, *see* Totora.

MONTERO; Santa Cruz
Schmitt and Schmitt, July 1984, 2.5 km by road N and 8 km by road E of (1718/6312), 300 m, in province of Santiesteban; MSB party, June 1988, 3 km S of (1723/6315); 3 km S and 11 km E of (1725/6309); 6 km S and 10 km E of (1724/6309; 8.5 km S and 8 km E of (1725/6311); May 1988, 10 km SE of (1725/6311); AMNH-MSB party, June 1991, 3 km SE of (1723/6315), at 3 km N of Villa Copacabana, 250 m.

MONTEVIDEO; Beni 1257/6442 (USBGN)
MARU, Sept. 1966; 20 km NE of San Joaquín.

MORA, *see* Ingeniero Mora.

MORÉ, PUERTO; Beni 1200/6506 (AMNH field map)
AMNH, July 1964 and Oct. 1965, on río Iténez about 20 to 30 km above its mouth.

MOSCAS; Beni 1307/6456 (MARU)
MARU, 1963, or Las Moscas.

MOSETENES, CORDILLERA DE; Cochabamba 1640/6603 (USBGN)
Luigi Balzan, 1891; Thomas (1906: 445), type locality of *Oryzomys* (*Oecomys*) *mamorae* (= *Oecomys mamorae*), also spelled Mosotenes; Misiones Mosetenes, Balzan (ca. 1600/6700).

MOTACÚ; Beni 1346/6437
Estancia, 50 km S of San Ramón; Yates and Salazar, Mar. 1993.

MOXOS, PROVINCIA DE; Beni 1510/6530 (USBGN)
d'Orbigny (1835: pl. 10), type localities of *Noctilio affinis* (= *N. albiventris affinis*) and of *Callithrix donacophilus* (p. 5, = *Callicebus donacophilus*), frequently spelled Mojos; CBF party, TIPNIS, 1992. See San Ignacio.

MOXOS; La Paz 1434/6853 (USBGN)
Nordenskiöld Expedition, 1904–1905, 1617 m, specimen in Stockholm, also spelled Mojos.

MUCDEN; Pando 1111/6902 (USBGN)
Izawa, Nov. and Dec. 1979, also spelled Mukden.

MUDELE; Beni N.L.
Webb, June 1969.

MUELLEMUELLE; Cochabamba N.L.
F. B. Steinbach, June 1920.

NAPO, RÍO N.L.
Moore, *Alouatta* in USNM.

NAREUDA, RÍO; Pando 1118/6846 (USBGN)
Izawa, Nov. and Dec. 1979; Anderson, May 1982, 1117/6855.

NAVIDAD; Beni 1305/6514 (USBGN)
AMNH, May 1965.

NAZARET; Pando 1111/6900 (MAPA)
Harada, Sept. 1984, at El Naranjal; also spelled Nazareth.

NEGRILLO, RÍO; Santa Cruz 1503/6245
MNK party, Oct. and Nov. 1992.

NEGRO, RÍO; Beni 1323/6442 (MARU)
Webb, Feb. 1969; El Bato, 150 km N of Trinidad (1330/longitude uncertain), specimens in Instituto Miguel Lillo; probably same as río Iruru-puru on some maps.

NEGRO, RÍO; Pando
RAP team, June and July 1992, main camp (0952/6542), 150 m, a camp on W bank of río, in Provincia General Federico Román; and "Gentry Camp" (0950/6540) on E bank about halfway between main camp and the mouth of the río; or "30 minutes up from mouth."

ÑEQUEJAHUIRA; La Paz ca. 1619/6752 (Tate fieldnotes)
Tate, May 1926, "A tiny pampa by side of the steel rail bridge where the Yungas road crosses the Unduavi river between Unduavi and Chaco"; 2450 m, Hall (1938: 67), type locality of *Mustela frenata boliviensis*; Sanborn (1950: 16), type locality of *Lenoxus apicalis boliviae*.

NICOLAS SUÁREZ ISLAND; Beni 1048/6525
AMNH, June 1964, in río Mamoré at Guajaramerin.

NORMANDIA, LAGUNA; Beni 1449/6623
EBD party, July 1985, on Estancia Florida.

NOVILLOS; Santa Cruz 1817/6341
de la Barrera, December 1954, 1830 m (Smit, 1987: 350).

NUEVA CALAMA; Beni 1248/6422 (MARU)
Webb, 28 Apr. 1970, on río Itonamas.

NUEVA ESPAÑA; Pando 1228/6836 (MLP)
Harada, 1984; Iseki et al. (1985); on left bank of río Madre de Dios.

NUEVA ESPERANZA; Santa Cruz 1945/6256
de la Barrera, July 1955, 580 m (Smit, 1987: 350).

NUEVA ETEA; Pando 1122/6658
AMNH-MSB, July 1986.

NUEVO BERLIN; Beni 1241/6506
AMNH, May 1965, 17 km NNW of (1232/6509), on W side of río Mamoré.

NUEVO MUNDO; Beni 1400/6600
Cabot, Sept. and Oct. 1983, a finca in province of Yacuma, west of Santa Ana, exact location unknown.

NUVE, *see* Ulla Ulla.

Ñ, *see* in list with the names beginning with N.

OCARA; La Paz 1539/6824 (USBGN)
Tate, Apr. 1926, 7500 ft (ca. 2500 m); 460 m higher than La Joya on the río Tipuani, the left bank forested, the right is pajonal or brush; spelled Okara.

OKINAWA; Santa Cruz 1713/6253
Harada, Aug. 1984.

OPLOCA, *see* Salo.

ORIÓN; Beni 1426/6700
Acho, May 1938, 35 km S of Reyes (Gyldenstolpe, 1945); 196 m at 1430/6720 according to Patterson (1992: 5).

OROMOMO; Beni 1602/6610
CBF party, May 1992, TIPNIS, province of Moxos, on río Sécure; 3 km NE of (1600/6608).

ORURO; Oruro 1759/6709 (USBGN)
Thomas (1894a: 70), type locality of *Dasypus Nationi* (= *Chaetophractus nationi*); Simons, Aug. 1901, at 3700 m; Pearson, Sept. 1955, 2 mi E of (1759/6707), 20 mi NE of (1745/6656), 40 mi S of (1834/6709), at 12,000 ft (= 3690 m); Anderson, Oct. 1979, 8 km N of (1754/6709); AMNH-MSB, Sept. 1986, 37 km SW of (1809/6724); capital of department.

OVEJUYO; La Paz 1632/6802
Miralles, May 1989.

OYANE, *see* Yani.

PACAY, PUERTO; Santa Cruz 1712/6245
MSB party, June 1988, 1 km SE of (1712/6245).

PADCAYA; Tarija 2152/6448
AMNH-MSB party, Aug. 1991, 11.5 km N and 5.5 km E of (2147/6440).

PADILLA; Chuquisaca 1919/6420 (USBGN)
de la Barrera, April 1955 (Fonseca, 1959: 93); Crossin, Nov. 1972, 70 km SE of, along río Azuero (= Azero; 1946/6353); 3600 ft (= 1100 m); 34 km SE of (1932/6407), 7800 ft (= 2380 m), in province of Tomina; AMNH-MSB party, July 1990; 11 km N and 16 km W of, 2050 m (1912/6427); 9 km by road N of, 2000 m (1918/6422); 16 km W of, 2500 m (1918/6427).

PAILÓN; Santa Cruz 1739/6245 (USBGN)
Estación on railroad, Anderson party, Sept. 1984, 3.5 km W of, 300 m (1739/6245), also El Pailón; AMNH-MSB party, June 1990, 30 km N of Estación Pailón (1726/6237); MNK party, May and Nov. 1992, 7 km N of (1734/6245), 8 km N

and 1 km E of (1733/6244), 0.5 km S of (1739/6245), and 7 km S of (1744/6245).

PAJARAL, LAGUNA; Santa Cruz 1458/6332
MNK party, Aug. 1992.

PALACIOS; Beni 1322/6520 (USBGN)
AMNH, May 1965, 4 km SE of (1324/6518), on W side of río Mamoré; Webb, Feb. and Mar. 1971, in Yacuma province; Palacios Ranch, 90 km S of Santa Ana, MARU, Nov. 1972 (1412/6527).

PALACIOS, RÍO; Beni 1417/6336
Felis wiedii, Zool. Staatssammlung, München.

PALCA; La Paz 1634/6759 (USBGN)
Simons, Nov. 1900, 18 mi E of La Paz, 3600 m.

PALMAR; Cochabamba 1706/6529 (USBGN)
J. Steinbach, Sept. 1928, at 2000 m in Yungas del Palmar; Carriker, July 1937, 940 m; F. Steinbach, Mar. 1941, Mar. 1949, Apr. 1950, Dec. 1954, 1000–1400 m; Berlioz (1959), Alto Palmar; F. Steinbach, Nov. 1955, Bajo Palmar; Cabrera (1956: 3), type locality of *Nasua nasua boliviensis*; Hershkovitz (1960: 542) as 1715/6523 and as El Palmal, province of Chapare; MSB party, July 1993, on río Cochi Mayu, 960 m, as El Palmar (1707/6533).

PALMAR; Santa Cruz 1751/6309 (USBGN)
Becerra, Hadden, Kerr, and Villalobos (MARU), Aug. 1966, in province of Ibáñez 10 km SE of Santa Cruz, also called El Palmar or El Palmal; MARU, Aug. 1966, El Palmar Road 7 km SE of Santa Cruz; MSB party, June 1988, Palmar del Oratorio (1753/6309).

PALMAR, LAGUNA, *see* Tiquipa.

PALMARES, LOS; Santa Cruz 1545/6100
Tello, July 1986.

PALMARITO; Santa Cruz 1649/6237 (USBGN)
J. Steinbach, May 1918, 400 m, on the río San Julián (San Miguel); Wavrin, July 1921, at 450 m.

PALMASOLA; Santa Cruz N.L.
Aguirre, Mar. 1990, 16 km from Santa Cruz, on road to Las Lomas (1755/6308).

PALMIRA; Pando 1142/6756 (MLP)
AMNH-MSB, Aug. 1986, 180 m.

PALO MARCADO; Tarija 2127/6307
Eisentraut (1933: 49), estancia about 50 km to the E or SE of Villa Montes (on río Pilcomayo), specimens in Berlin.

PALOMETA, RÍO; Santa Cruz 1722/6333
J. Steinbach, June 1917 (FMNH), same as Palometillas, coordinates given for crossing of main road.

PALOMETILLAS, RÍO; Santa Cruz 1722/6333
J. Steinbach, Nov. 1914, Dec. 1926; Sanborn (1937: 329); Tate (1933: 138) as Palomotitlas, a tributary of río Piray, Buenavista (Hershkovitz, 1992b: 53, as at 1736/6337); AMNH-MSB, Aug. 1985, 5 km E of (1722/6332); locally known as Palometa.

PALOS BLANCOS; La Paz 1534/6716 (MLP)
IBBA, Feb. 1985; Guerra, Aug. 1989, 6 km [NE] on old road to San Borja (1533/6714); Mercado, Nov. 1990.

PALOS BLANCOS; Tarija 2122/6351 (USBGN)
Anderson, Oct. 1979, 18 km (by road) W of (2122/6358); AMNH-MSB party, July 1991, 2 km S and 5 km E of (2126/6344), 800 m.

PAMPA AULLAGA; Oruro 1911/6705 (USBGN)
Simons, Oct. 1901, also spelled Olliaga or Aulliaga; Thomas (1902b), 3700 m, and 3800 m type localities of *Conepatus arequipae* (p. 226, = *C. chinga rex*) and of *Kerodon niata pallidior* (p. 229, = *Microcavia niata pallidior*); Thomas (1907a: 443), type locality of *Viscaccia lutea* (= *Lagidium viscacia cuvieri*).

PAMPA DE LA ISLA; Santa Cruz ca. 1748/6310
Specimen in Rio de Janeiro (R. M. Wetzel, personal commun.), prov. Cercado, no other data.

PAMPA DEL INCA; Potosí 2235/6720
EBD party, Nov. 1982.

PAMPA DE MEIO, *see* Meio.

PAMPATAMBO, VALLE DE; Cochabamba 1705/6543
EBD party, Aug. 1982, bought specimens from hunter Eloy Montano, ca. 1000 to 1500 m, coordinates estimated, 74 km from Cochabamba, cerca del salto hidroelectrico, 2550 m.

PAMPITAS, LAS; Beni 1255/6438 (MAPA)
Webb, May 1970, in province of Mamoré.

PAQUICHA; La Paz 1432/6934
CBF party, Oct. 1991, *Mazama* at CBF.

PARAGUA, RÍO; Beni 1334/6153 (USBGN)
Natterer (Pelzeln, 1883: 127) as "Paraqu."

PARAGUA, RÍO; in Santa Cruz
EBD party, Sept. 1986, near Florida (1436/6111).

PARANOVA, LAGINHA DO; Brazil N.L.
On río Mamoré; Natterer, 24 Aug. 1829 (Pelzeln, 1883: 15).

PARAPETI; Santa Cruz ca. 2000/6300
Wavrin, Feb. 1922, in province of Cordillera; also spelled Garapety. See also San Antonio.

PARAPETI, RÍO; Santa Cruz 1926/6231
EBD party, Sept. 1986.

PARI, EL; Santa Cruz 1750/6315 (MAPA)
A little town one-half league from Santa Cruz de la Sierra, Burmeister (1863), type locality of *Chlamyphorus retusus*.

PAROTANI; Cochabamba 1734/6621 (USBGN)

Waterhouse (1848), type locality (by revisor's restriction, Thomas, 1911b: 255) of *Cavia boliviensis* (= *Galea musteloides musteloides*), Simons, April 1901, as Paratoni, at 2500 and 2600 m (1730/6600 on label); Thomas (1902a: 134) as Paratani; Thomas (1907a: 443) type locality of *Viscaccia cuscus* (= *Lagidium viscacia cuscus*); Becker, Feb. 1915; Day (1916: 32) as Parotain; USNM, spelling as Parotoni; Miller and Boyle, at 8800 ft (= 2710 m); Osgood (1916: 210); Cabrera (1958: 30) cited Porotani as type locality for *Marmosa elegans venusta* Thomas, 1902e (p. 159, = *Thylamys venustus*); Pearson, Nov. 1971, 4 mi or 6.4 km N of (1730/6621), 8500 ft (= 2615 m); 6 mi or 9.6 km W of (1734/6627), 10,600 ft (= 3260 m); Hershkovitz (1962: 248); Pearson and Patton (1976: 341).

PARQUE NACIONAL "NOEL KEMPFF MERCADO"; Santa Cruz
MNK party, July 1991 (1432/6053); see Fierro, Cascada, Encante.

PASCANA, LA; Beni 1446/6621
Campamento on Estación Biológica de Beni; Hinojosa and Salazar, Jan. and Mar. 1988.

PASTIZAL; Beni, *see* Espíritu.

PATIÑO, PUERTO; Cochabamba 1637/6547 (USBGN)
Creighton, 1978, 50 km NW of Villa Tunari.

PATUJUSAL; Beni N.L.
CBF party, or San Francisco de Patujusal, on río Sécure.

PAU GRANDE, CACHUELA; Beni 1028/6524 (USBGN)
Natterer, (Pelzeln, 1883: 127), as Cachoeira do Pau grande.

PAVAS, LAS N.L.
MARU, 1963.

PAZNA; Oruro 1836/6655 (USBGN)
Creighton, Dec. 1979, 10 km (by road) SW of (1840/6659), at Finca Santa Helena, 3750 m.

PELECHUCO; La Paz 1448/6904 (USBGN)
Jungius (1974) studied *Odocoileus virginianus* here (no specimens known to have been preserved by him); S. Anderson and J. Anderson, Sept. 1980, 3650 m; Instituto de Ecología, Apr. 1980; Kucera, June 1982, 1 km W of the pass between Antequilla and Pelechuco (1448/6910); Vargas, Sept. 1990; Kessler, Aug. 1991, 3700 m.

PELICANO, *see* Zanja Honda.

PEÑA BLANCA; Cochabamba 1830/6510 (ACB)
Anderson, July 1983; 2 km NW of, 1700 m (1829/6510).

PEÑAS, LAS; Beni 1244/6428 (MARU)
MARU, 1963; Webb, Apr., and May 1970, on río Machupo.

PEÑITAS, LAS; Beni ca. 1247/6435
43 km NE San Joaquín.

PERDIX, LA; Santa Cruz N.L.
J. Steinbach, Dec. 1921, province of Sara.

PERERETA; Cochabamba N.L.

PÉREZ, ESTACIÓN OR GENERAL; La Paz 1730/6910 (USBGN)
F. Steinbach, Sept. 1941, province of Pacajes; Hershkovitz (1962: 247), 3914 m at railway station on río Mauri; see also Charazani.

PERFORACIÓN; Santa Cruz 1955/6233
An estancia or puesto; EBD party, 1986, at Perforación and 40 km S of (2020/6234); Emmons, Oct. 1991, as Puesto Perforación (Parker et al., 1993).

PERSEVERENCIA; Santa Cruz 1438/6237
MNK party, June and July 1992.

PERU; Beni, *see* Espíritu.

PIEDRAS, LAS; Pando 1102/6607 (quadr.)
Dickerman and Ruedas, July 1986, 170 m.

PIEDRAS BLANCAS; Beni 1315/6420
Tello, June, July, 1986.

PILCOMAYO, RÍO 2521/5742 (USBGN)
Thomas (1898b: 2); Miller and Boyle, 1915; Herrmann, Eisentraut (1933: 47); Upper Pilcomayo, presumably in Chuquisaca, 1927, specimens in Frankfurt.

PILÓN, SERRANÍA; Beni 1515/6702
C. G. Schmitt and D. C. Schmitt, Sept. 1984, 27 km by road N of río Quiquibay, on road to San Borja, 1025 m (1515/6702); AMNH-MSB party, July 1992, 1000 m, as Serranía de Pilón (1517/6704 GPS).

PINOS; Tarija ca. 2128/6418 (MAPA)
Budín, Jan. and Feb. 1925, as 1700 m; Thomas (1926b: 322) as Pino, 1800 m; Tate (1933: 220); Hershkovitz (1962: 254).

PINOS, LOS; La Paz 1633/6803 (Yoneda, 1984)
Yoneda, Feb. 1983, 3400 m.

PIRAY, RÍO; Santa Cruz 1632/6345 (USBGN)
d'Orbigny, Nov. 1830, Sept. 1832, perhaps near Santa Cruz de la Sierra (1748/6310); J. Steinbach, Feb. 1921, at 450 m, also spelled Pirai; AMNH-MSB, Aug. 1984, 300 m, 1 km W of (1720/6320); see also Colonia Piray.

PIRIRENDA; Chuquisaca 2016/6343
de la Berrara, 1955 (Fonseca, 1959: 93), or Pirarenda.

PITASAMA, RÍO; Santa Cruz 1738/6334
Hinchcliffe and Strachan, Aug. 1987, 500 m (1742/6337) and 575 m (1743/6338); also spelled Pitisama; see Cerro Amboró.

PITIGUAYA; La Paz ca. 1621/6747 (Tate field map)

Tate, May 1926, at 5800 ft (= 1785 m), in the valley of the río Unduavi, off the main road to Yungas which passes high up the hillside a thousand feet above the property of the hacienda La Florida, 1621/6746 (USBGN); Tate (1931b: 11), type localities of *Marmosa unduaviensis* (= *Gracilinanus agilis unduaviensis*) and *Marmosa yungasensis* (= *Marmosops dorothea*); Creighton, Nov. and Dec. 1979, 1700 m, at hacienda La Florida.

POCCATA, see Achacachi.

POCITOS; Santa Cruz N.L.
UMMZ, near road to Montero, NE of Santa Cruz de la Sierra.

POCOATA; Potosí 1841/6611
Anderson, July 1983, 3370 m; 3 km SE of (1844/6609).

POCONA; Cochabamba 1739/6524 (USBGN)
d'Orbigny, Oct. 1830; F. B. Steinbach, Dec. 1926, Feb. 1927, at 2700 m.

POMATA AYTE; Oruro
AMNH-MSB, Sept. 1986, 3670 m, 5 km W and 1 km N of, at río Barros (1819/6759).

PONDEROSA, LA; Santa Cruz 1654/6348
Cabot, Nov. 1983, an estancia 27 km NW of Santa Rosa de Sara, province of Gutierrez.

PONGO; La Paz 1620/6756 (USBGN)
Tate, Feb.–Mar. 1926, at 12,000 ft (= 3690 m), a small station on the former Yungas Railroad in the canyon of the río Unduavi. Carriker, Jan. 1935, as El Pongo.

POOPÓ; Oruro 1823/6659 (USBGN)
Yoneda, June 1983, 3720 m.

PORTACHUELO; Santa Cruz
AMNH-MSB, Aug. 1984, 300 m, 3 km WSW of (1722/6325).

PORVENIR, EL; Beni 1451/6621
Ergueta, Sept. 1985, 15 km N of (1444/6623); Flores, Nov. 1985; Salazar and Wilson, Sept. 1987, 5 km N of Estancia El Porvenir, Isla de Bosque, 290 m (1450/6623); see also Estación Biológica de Beni.

PORVENIR, Chuquisaca 2045/6313
AMNH-MSB, July 1985, at Planta Porvenir of Occidental Boliviano petroleum company, 1.3 km SW of (2045/6313), 1.5 km NW (2045/6313), 10 km NE of (2041/6309).

POSTA, *see* Cabrada.

POTOSÍ; Potosí 1935/6545 (USBGN)
Waterhouse *in* Bridges (1846: 9), type locality of *Hesperomys Boliviensis* (= *Auliscomys boliviensis boliviensis*), is a few leagues to the south of Potosí; Simons, Sept. and Oct. 1901 (1942/6542); Thomas (1902b), type locality of *Akodon spegazzinii* (p. 226, = *A. boliviensis spegazzinii*), 4400 m; Thomas (1902c: 115), type locality of *Neoctodon simonsi* (eq; *Octodontomys gliroides*), and of *Ctenomys frater* (p. 228); Carriker, Jan. 1938, 4200 m; Pearson, Oct. 1955, 20 mi S of (1952/6545), at 12,300 ft (= 3785 m); capital of department. Potosí Peak (1940/6540).

POZAS, LAS; Cochabamba 1657/6523
A hotel 4 km SE of Villa Tunari; EBD party, Sept. 1982, as Balneario de (1657/6523), 2 km SW of (1658/6524).

POZOS, LOS; Santa Cruz 1940/6340
de la Barrera, July 1955 (Smit, 1987: 350).

PRECÁMBRICO, CAMPAMENTO; Santa Cruz 1430/6054
EBD party, Aug. 1986, north of Los Fierros, which see also.

PRINCIPE DA BEIRA; Brazil 1225/6427 (MAPA)
Natterer, 20 Aug. 1829 (Pelzeln, 1883: 127); AMNH, 1963, from which were designated localities in Beni on the other side of the río Iténez; opposite bank (1225/6428); 50 km NW of, between Bahía da Onça and Casa Alta (1205/6445); type locality río Guaporé at Forte Principe da Beira, by restriction by Pilleri and Arvey (1977) of *Inia boliviensis*, d'Orbigny (1834: 22; = *Inia geoffrensis boliviensis*).

PROVIDENCIA; Beni 1301/6503 (MARU)
MARU, 1963.

PUCAMAYO; Chuquisaca 1957/6355 (USBGN)
Arduz, Aug. 1951, in valley of río Bañado.

PUCARA; Santa Cruz 1843/6422
de la Barrera, Sept. 1954, 2400 m (Hopkins and Rothschild, 1966: 136).

PUENTE DE CHOCULO; La Paz 1649/6741
Simons, Dec. 1900; Thomas (1910c: 505), at 1200 m; or Puente Chojcolaca.

PUERTO, *see* under names such as Acre, Almacen, Caballo, etc.

PULACAYO; Potosí 2025/6641 (USBGN)
Isolated antlers of *Hippocamelus* (Neveu-Lemaire and Grandidier, 1911: 28).

PULQUI ALTO; Chuquisaca 1914/6513 (USBGN)
Miller and Boyle, 1915, at 9400 ft (= 2890 m); also spelled Pulce.

PUNATA; Cochabamba 1733/6550 (USBGN)
Pearson, Sept. 1955, 8 mi NE of (1728/6545), at 10,000 ft (= 3075 m), and 10 mi NE of (1727/6547), at 10,500 ft (= 3230 m).

PUNTA RIELES; Santa Cruz 1635/6412
CENETROP, 1985, 1986, on río Yapacaní.

PUQUI; Oruro 1934/6723
Mercado, 1986.

QUEBRADA CAPAÑA, *see* Tatarani.

QUEBRADA KOHUIR; Oruro 1808/6857
CBF party, Oct. 1992.

QUEBRADO DE ESPEJOS; Santa Cruz 1759/6323
Felis wiedii, Zool. Staatssammlung, München, no other information.

QUETENA, CERRO; Potosí
Salazar, Nov. 1989, 10 km E of (2145/6723).

QUETENA; Potosí 2211/6720
EBD party, Nov. 1982, at Quetena Chica on río Quetena; Nov. 1987; MNLP party, June and Dec. 1989, 4200 m.

QUIÑE; Santa Cruz
AMNH-MSB party, May 1991, 6 km NNE of, at Estancia Jahue (1802/6419), 1975 m; 2 km NNE of (1805/6420), 2000 m; 5 km NE of (1803/6419), 1975 m; 3 km NE of (1805/6419), 2050 m; 17 km S of (1812/6418), at Estancia Laja, 2100 m; 2 km NE of (1805/6420), 2100 m; 1 km NE of (1811/6344), 1300 m.

QUIQUIBEY, RÍO; La Paz 1431/6735 (USBGN)
Yoneda, July 1983, 10 km from mouth 1445/6730 (Yoneda, 1984e); Schmitt and Schmitt, Sept. 1984, 27 km N of río Quiquibey on road to San Borja (1515/6702) in Serranía Pilón, 1025 or 1100 m; Mercado, 1990 (1527/6705).

QUISI QUISINI, MOUNT; Oruro N.L.
CBF party, Apr. 1991, south slope of, half the distance from mountain to Tambo Quemado (1816/6904), armadillo obtained by R. Calle (Yensen et al., 1994: 407).

QUIZER, RÍO; Santa Cruz 1637/6246 (USBGN)
J. Steinbach, May–June 1918, at 700 m; Hershkovitz (1977: 583) as río Quiser and as 1630/6230; Schmitt and Schmitt, Jan. 1984, río Quiser, on road from San Ramón to Concepción (1634/6225), 300 m.

REMANSO; Beni 1334/6154
AMNH, ca. 1 km below mouth of río Paraguá, on río Iténez, also spelled Remansos.

REMANSO; Pando 1056/6618 (quadr.)
AMNH-MSB, Aug. 1986, 160 m; CBF party, Oct. 1991.

REPECHON, CAVERNAS DE, see Villa Tunari.

RESERVA, see Estación Biológica de Beni.

RESERVA, LA; La Paz 1544/6731 (GPS)
AMNH-MSB party, July 1992, at 840 m (1544/6731) and at 950 m (1543/6731); CBF party, Sept. 1992, 1100 m, 1 km S of (1545/6731), in province of Nor Yungas.

REYES; Beni 1419/6723 (USBGN)
Rusby, June 1886; Allen (1889: 78); Balzan, 1892; Doria, prior to 1906; W. M. Mann, 1922; Olalla, Dec. 1937, at 196 m; Gyldenstolpe (1945: 15); G. Mann F., 1948 (Mann, 1951); Davis (1968: 691); Patterson, (1992: 5); on open pampas surrounded by marshes.

RIBERALTA; Beni 1059/6606 (USBGN)
173 m; Mann, Mar. 1922; A. M. Olalla, 1937; Lönnberg (1942: 30); Hibbs and Peyton, May 1965; Kuns, May 1965, 13 km W of (1105/6605), 13 km NE of (1053/6600), on south bank of río Beni; 2.3 km W of, in Pando (1059/6607); Ranck, Nov. 1966, 10 km NNE of (1055/6602), in province of Vaca Díez on the río Beni, 173 m; Heltne et al. (1976: appendix I; primate censuses at "1212/6545" some 40 km E of Riberalta and 18 km S of the Riberalta to Guajaramarin road, at "1200/6555" some 20 km E of Riberalta and 5 km N of the above noted road, at "1212/6542" some 2 km W of río Yata on above noted road, at "1212/6535" some 10 km E of río Yata on above noted road, at "1207/6545" some 40 km E of Riberalta and 6 km S of road, and up the río Madre de Dios some 25 km, no coordinates given). The coordinates in quotes are probably all 11° S, not 12° as indicated. The following localities designated as distances from Riberalta are in Pando; 3.5 km NW of, on NW bank of río Beni (1057/6608), 5 km NW of, on N bank of río Madre de Dios (1056/6608), and 13 km NW of, on S bank of río Madre de Dios (1054/6611).

RIBERON, CACHUELA; Pando 1012/6519 (USBGN)
Natterer (Pelzeln, 1883: 127), as Cachoeira do Ribeirao.

RÍO, *see* names of, such as Aceromarca, Apere, Baures, Cachimayo, etc. The coordinates for rivers are at their mouths, unless indicated otherwise. Note that río is accented in Spanish but not in Portuguese. There is some inconsistency in Spanish usage in regard to the capitalization of río, when used with a specific name as in río Grande versus Río Grande. Cabrera (1958, 1961a) consistently used the lower case río. In English usage, when part of a proper name (as in Yapacaní River), the word is capitalized. In plural usage, as in Yapacaní and Pirai rivers, the r is in lower case.

ROBORÉ; Santa Cruz 1820/5945
AMNH-MSB, Oct. 1984, 300 m; 7 km N and 38 km W of, 550 m (1816/6007); 29.5 km W of, 475 m (1819/6002); 9 km N and 10 km W of, 300 m (1815/5951).

RODEO; Cochabamba 1737/6538 (ACB)
C. G. Schmitt and D. C. Schmitt, Mar. 1984, 9.5 km by road SE of, and then 2.5 km on road to ENTEL antenna, 3875 m (1740/6535); Salazar, July 1991, 7.5 km SE of, 3800 m, (1740/6535); MSB party, 1993, 7.5 km SE of, 4000 m (1741/6536 GPS).

ROQUEFALDA; Cochabamba ca. 1710/6600
Cherrie, 1915; Osgood (1916: 204); Chapman (1924: 7), one day from Incachaca and two days from Jatumpampa.

ROSAL; Chuquisaca 1928/6406
Marzana and Macchiavello, Apr. 1949, in province of "Tihumayu," 1800 m; de la Barrera, July 1955, 2210 m (Smit, 1987: 350), as El Rosal.

ROSARIO; Beni 1221/6651 (USBGN)
Mann, on Mulford Expedition, 1921 or 1922.

RUBIO, PUERTO; Beni 1308/6227 (MAPA 1980)
AMNH, July 1964.

RURRENABAQUE; Beni 1428/6734 (USBGN)
W. M. Mann, "1921–2" (USNM); G. Mann F., 1948 (Mann, 1951); Baudoin, May 1971; AMNH, Aug. and Sept. 1980; S. Beck, Instituto de Ecología, Jan. 1982; AMNH-MSB, Sept. 1985, 3 km S of (1430/6734); Szwagrzak, July 1986.

SACRAMENTO ALTO; La Paz 1616/6747
Webster, 1979, 2575 m; Remsen, Aug. 1979 (Webster and Jones, 1980), 8 km by road N of Chuspipata, 2375 m.

SAGUAYO, RÍO; Santa Cruz
In province of Sara (CM, *Galictis*); Riddle, Sept. 1985; Hinchcliffe and Strachan, July 1987, 470 m (1735/6348); see San Rafael de Amboró and Suguago; Tapia, Mar. 1989.

SAJAMA; Oruro town at 1807/6900 (USBGN)
G. and O. Garlepp, May 1897, Apr. 1901; 4000 m; F. Steinbach, perhaps at 4350 m but this is uncertain; Hershkovitz (1962: 247); Mount Sahama, or pueblo at SW base of Nevado de Sajama (MAPA) at 1807/6900 (USBGN) according to Paynter et al. (1975: 50); see Esperanza also; Wagner (1848: 75), type locality of *Ctenomys opimus*, restricted to Mount Sajama by Thomas: 1900; Yoneda, June 1983, at Estancia Mamaniri, 14 km N and 7 km E of Mount Sajama, 4150 m (1759/6849); CBF parties, Oct., Nov., and Dec. 1992, Sahama in the following localities refers to the village rather than the mountain (Yensen and Tarifa, 1993); 14 km N and 1 km E of Sajama at Quebrada Viscachani, 4500 m (1801/6857); 10 N and 4 E of Sajama at Laguna Huana Kkota, 4320 m (1802/6856); 8 km N of Sajama at hot springs on río Junthoma, 4400 m (1802/6858); 9 km N and 4 km E of Sajama at Jincho Asjata Loma, 4400 m (1803/6856); 8 km NW of Sajama, 4400 m (or 5 km N and 8 km W of, at the Cañon Junthuma Khuchu, 1804/6900); 5 km N of Sajama near aguas termales, 4290 m (1805/6858); 2.5 km N and 2 km E of Sajama at Cerro Huincurata, 4400 to 4500 m (1806/6857); 4 km N of Sajama, 4250 m (1806/6859); 3 km E of, at Quebrada Kahuiri, 4500 m (1808/6857); 1 km SE of Sajama, 4220 m (1808/6858); 1.5 to 2 km SW of Sajama, 4200 m (1808/6858); 8 km ESE (or 8 km E and 2 km S) of Sajama at Loma Jiskha Khara Huinchinca, 4600 to 4700 m (1809/6855); "Campamento Base 1," 4700 m (1810/6858); 4.5 km SE of Sajama, 4200 m (1810/6857); see also Jacha Khaca.

SAJTA; Cochabamba 1706/6447 (GPS)
MSB party, June 1993, 250 m; in a few cases spelled Sacta or designated as Valle de Sajta.

SALINAS, ARROYO; Beni N.L.
CBF party, on río Sécure.

SALINAS, PUERTO; Beni 1420/6733 (USBGN)
A. M. Olalla, Nov.–Dec. 1937, on the río Beni; Lönnberg (1941: 24); type locality of *Alouatta beniensis* (= *A. guariba beniensis*), at 196 m; or 226 m (Patterson, 1992: 5).

SALLA; La Paz 1710/6738
Yoneda, 1981, spelled as Saya, coordinates given as 1638/6727; Aug. and Sept. 1982, 3500 m.

SALO; Potosí 2115/6544 (USBGN)
Carriker, Feb. 1938, Finca Salo, near Oploca (2119/6546, 4000 m). On map (MAPA) as Salla.

SAMA; Tarija 2129/6502 (USBGN)
Budín, Mar., Apr., and May 1925, 4000 m; Thomas (1926b 323), 50 km W of Tarija; type locality of *Ctenomys lewisi* Thomas; AMNH-MSB party, July 1991, Serranía Sama (2127/6452), 3200 m.

SAMAIPATA; Santa Cruz 1809/6352 (USBGN)
J. and F. B. Steinbach, Aug. 1926, at 2000 m; Carriker, Oct. and Nov. 1937, 1525 and 1675 m, as Semaipata; de la Barrera, Jan. 1955, as 1650 m (Fonseca, 1959: 130); AMNH-MSB party, May 1991, 3 km E of (1810/6349), 1500 m.

SAMAYHUATE; Tarija 2143/6255 (USBGN)
Eisentraut (1933: 49) an estancia about 100 km to the E or SE of Villa Montes as Semuhuate; Eisentraut, Oct. 1979, as Estancia Samuhuate, 110 km SE villa Montes (ZFMK).

SAN ANDRÉS; Beni 1500/6430
MARU, 1963.

SAN ANDRÉS DE MACHACA; La Paz 1644/6901 (USBGN)
Bridges, prior to 1848; Waterhouse (1848: 281), type locality of *Ctenomys leucodon*; to the south of Lake Titicaca; AMNH-MSB, Oct. 1986, 14 km by road SW of, 3850 m (1648/6853); MSB party, Aug. 1993, 8.5 km W of, 3850 m (1659/6902, GPS), 11.5 km W of, 3800 m (1700/6903); 13 km W of, 3800 m, (1705/6905); 16 km W of, 3776 m (1701/6906).

SAN ANTONIO; Chuquisaca N.L.
EBD party, Nov. 1982, a finca near Villa Abecia.

SAN ANTONIO; Cochabamba 1657/6524
Miller and Boyle, Aug. 1915, at 1300 ft (= 400 m); Anthony (1920: 82); as Misión de San Antonio, type locality of *Dactylomys boliviensis*; at junction of ríos San Antonio and Espíritu Santo; Paynter et al. (1975: 51) as San Antonio del Chimoré, ca. 300 m (1643/6507), later named Villa Tunari.

SAN ANTONIO; Santa Cruz 2001/6313 (USBGN)
Marquis de Wavrin; Dec. 1920, Jan., Feb, and Mar. 1921; Thomas (1921f: 623), on the río Parapetí at 600 m and latitude 20°, 250 km S of Santa Cruz de la Sierra; type locality of *Hesperomys muriculus* (= *Calomys callosus callosus*); and of *Galea boliviensis demissa* (= *G. musteloides demissa*); Paynter et al. (1975: 42) cite río Parapetí, at 1858/6221 (USBGN).

SAN ANTONIO, RÍO 1657/6524
At junction with río Espíritu Santo; Osgood (1916).

SAN ANTONIO DE LIPEZ; Potosí 2151/6651 (USBGN)
Budín, Jan. 1926, 4510 m; Thomas (1926d: 193) "about 60 km to the west of Santa Catalina [Argentina]."

SAN ANTONIO DE LORA; Beni 1507/6455 (USBGN)
AMNH, July 1965, ca. 10 km E of San Antonio (1508/6451).

SAN BARTOLO, see San Joaquín.

SAN BENITO, CERRO; Cochabamba
J. Steinbach, Sept. 1921 (FMNH); probably ar San Benito (town at 1731/6555); F. Steinbach, July 1938.

SAN BERNARDO; Beni N.L.
CBF party, May 1992, TIPNIS, on río Sécure.

SAN BORJA; Beni 1449/6651
Cabot, Oct. 1983, 60 km E of, on road (1451/6612); 65 km E of, on road (1451/6610 = Glavir); EBD party, July 1984, km 44 [marker on road E of] (1450/6621); Anderson, Sept. 1984, 3 km N and 43.5 km E of, 225 m (1450/6621); 9 km N and 42.5 km E of, 225 m (1446/6621); Schmitt and Schmitt, Oct. 1984, 3 km SW of (1451/6653), 450 m; Jordán, Mar. 1986, 22 km E of, at Estación ganadera San Marcos, 225 m (1449/6638); Mercado, 1987, entre la Embocada y San Borja (ca. 1457/6659).

SAN BUENAVENTURA; La Paz 1428/6735 (USBGN)
S. Anderson, J. Anderson, and P. Remsik, Aug. and Sept. 1980, localities designated as 12 km W of (1427/6741), 30 km NW of (1416/6747), 20 km NW of (1420/6743), and 30 km W of (1428/6754).

SAN CARLOS; La Paz 1524/6811 (USBGN)
Simons, Sept. and Oct. 1900, 1000 m and 1200 m; coordinates are uncertain since there are several places named San Carlos in La Paz.

SAN CARLOS; Santa Cruz 1724/6345 (USBGN)
F. B. Steinbach, Sept. 1938; Hershkovitz (1962: 166); Paynter et al. (1975: 51), ca. 300 m, NW of Buenavista (MHA); N. Ibáñez, Nov. 1989; *Cabassous*, 80 km N of (1640/6345).

SAN CRISTÓBAL; Cochabamba N.L.
Carriker, Jan. 1937, 2740 m, near Cochabamba (1724/6609).

SANDILLANI; La Paz 1612/6754 (USBGN)
Carriker, Dec. 1934, 2070 m; EBD party, June 1984.

SAN ERNESTO; La Paz 1515/6810
Simons, Aug. and Sept. 1900, 1000 m; Allen (1915a: 204); Thomas (1901a: 183), type locality of *Oxymycterus iris* (= *O. inca iris*), is San Ernesto, Mapiri, also spelled Mapirio, presumably at 1515/6810.

SAN FERMIN; Santa Cruz 1848/5837 (USBGN)
Kreig, 1926 (Laubmann, 1930), ca. 140 m (MHA).

SAN FERNANDO; Santa Cruz 1715/5841
RAP team, Oct. 1991 (Parker et al., 1993: 54).

SAN FRANCISCO, PUERTO; Cochabamba 1637/6514
38 km from Villa Tunari on río Matamoro.

SAN FRANCISCO; Tarija 2115/6330 (USBGN)
Thomas (1898b: 2), Misión. Eisentraut (1933: 47). Same place as Villa Montes, 440 m.

SAN FRANCISCO DE PATURUBAL; Beni N.L.
CBF party, May 1992, TIPNIS, on río Securé; see also Patuhusal.

SAN IGNACIO; Beni 1453/6536 (USBGN)
Hibbs, May and June 1965, in Moxos province, 230 m; 1 km SW of; 3.6 km NNE of (1451/6535); AMNH-MSB, Aug. 1985, 15 km by road W of (1450/6542), 240 m.

SAN IGNACIO; Santa Cruz 1623/6059 (USBGN)
Kreig, 1926 (R. M. Wetzel, personal commun., specimen in Munich); USNM, province of Velasco; Hibbs, June 1965; Peyton, June and July 1965; Acasigue et al., Oct. and Dec. 1966.

SAN JACINTO; Cochabamba 1710/6544 (USBGN)
Carriker, May 1937, 2010 m.

SAN JAVIER; Beni 1434/6442 (USBGN)
AMNH, Sept. 1965, 23 km W of (1434/6455), on río Mamoré; 20 km S of (1446/6442).

SAN JAVIER; Santa Cruz 1621/6239
MNLP, Oct. 1979; CBF party, Nov. 1992, 12 km S of (1627/6239).

SAN JOAQUÍN; Beni 1304/6449 (USBGN)
Kuns, Mar., Apr., May, July, Aug. 1965, Jan. 1966; AMNH, Dec. 1965, 10 km SW of (1308/6453), 12 km S of (1311/6449), 20 km S of, at Estancia Yutiole (1315/6448); ca. 200 m, on left bank of río Machupo (MHA); 5 km E of, on río Machupo (1304/6446); MARU, 1963 and 1964, 4 km S of (1306/6449); Aguadulce, "5 or 10" km N of (ca. 1303/6450); Acapulco, 60 km E of (1304/6416); Ajunta, Asunta, or Azunta, 20 km NW of (1258/6459); Caravani, 17 km N of (1255/6449); Estancia El Totaí, about 20 km S of (1311/6451); San Juan or San Juan de Fribol, 4 km S of (1306/6448); Yuatre, or 2 km E of (1317/6448); San Bartolo, 15 km N of (1258/6450); Yuatre, 25 km SW of San Joaquín (1318/6448); San Marco, 3.2 km SW of (1310/6449); MARU, 1965, La Esperanza, small farm on edge of climax forest near San Joaquín Lagoon (Laguna Saramuchiqui), 1.6 km W of (1305/6450); Barba and Kuns, Sept. 1966, Boa Vista, 29 km NW of (1251/6456); Yutiole, 3 leagues S of, Webb, July 1969 (1315/6448). Kuns, Webb, Ovirese, and Barba, 1967–1970.

SAN JOSÉ; Cochabamba 1706/6547 (USBGN)
J. Steinbach, Nov. 1921; Yunga San José, specimens in CM and FMNH, coordinates are an approximation.

SAN JOSÉ; Santa Cruz 1756/6322
Maffei, July 1990; in province of Andrés Ibáñez.

SAN JOSECITO; Tarija 2109/6413 (ACB)
Brown-Rumiz, Mar. 1983, at 2000 m (*Tremarctos*, MACN).

SAN JOSÉ DE CHIQUITOS, see Chiquitos.

SAN JOSÉ LLANGUAS 1725/6755
CBF party, Mendez, Bernal, and "LPG"; Apr. 1992; in province of Aroma.

SAN JUAN, *see* Altwa San Juan, or San Joaquín, or Trinidad.

SAN JUAN; Santa Cruz 1718/6355
Harada, Sept. 1984.

SAN JUAN DE NUEVO MUNDO; Pando 1046/6640
RAP team in June and July 1992, a barraca on the springs of the headwaters of the río Negro, 170 m, in Provincia Abuna, 18 km N of (1046/6644).

SAN JULIÁN, RÍO; Santa Cruz 1615/6300 (USBGN)
Hershkovitz (1977: 583).

SAN LORENZO; Beni 1155/6504
ANMH, July 1964, at mouth of río Iténez.

SAN LORENZO; Beni ca. 1422/6725 (Gyldenstolpe 1945: map)
A. M. Olalla, 1938, Stockholm; AMNH, July 1964; Paynter et al. (1975: 53) "196 m., an estancia. . .surrounded by forest, fields, and swamp, Olalla, May 1938."

SAN LORENZO; Beni 1501/6438
MNLP, Jan. 1982, in Marbán province.

SAN LORENZO; Tarija 2126/6447 (USBGN)
Carriker, July 1936, 2040 m.

SAN LORENZO, PUERTO; Beni 1545/6523
CBF party, May 1992, TIPNIS, province of Moxos, on río Sécure; CBF party, May 1992, 15 km NE or down river (1536/6523); 3 km N of (1543/6523).

SAN LORENZO, PUERTO; Pando N.L.
CBF party, Oct. 1992, 8 km SW of (1216/6827).

SAN MARCO; Beni 1310/6449 (MARU)
MARU, 1963, Mar. and Apr. 1965; 3.2 and 3.5 km SW of San Joaquín.

SAN MATEO; Cochabamba 1742/6442 (USBGN)
F. Steinbach, Jan. 1929; Paynter et al. (1975: 54) ca. 1300 m, on río San Mateo, headwaters of río Ichilo (MHA); Olrog, Aug. 1959, "260 km E of Cochabamba."

SAN MATÍAS; Santa Cruz 1622/5824 (USBGN)
Haseman, June and Aug. 1909; Sanborn (1932a: 176).

SAN MIGUEL; La Paz 1633/6806
MNLP, Feb. 1985, province of Murillo.

SAN MIGUEL; Pando 1140/6743
CBF party, Oct. 1991.

SAN MIGUEL; Santa Cruz N.L.
A hospital, in province of Chiquitos, CBF party, F. Guerra, Dec. 1989.

SAN MIGUEL RINCÓN; Santa Cruz 1723/6332
MNH-MSB, Aug. 1984, 300 m; Harada, Aug. 1984; Iseki et al. (1985).

SAN PABLO; Beni 1305/6459 (MARU)
MARU, 1963; Tello, June 1986, Aserradero Monte de San Pablo (1305/6453), San Pablo Village (1305/6459); Aug. 1986, río San Pablo, 40 km N of village (1249/6502).

SAN PABLO DE LIPEZ; Potosí N.L.
Salazar (1990: 188).

SAN PEDRO; Beni 1420/6450 (USBGN)
MARU, 1963; AMNH, Sept. 1965, ca. 10 km W of (1420/6455), on río Mamoré.

SAN PEDRO; Cochabamba, see Chipiriri.

SAN PEDRO; Santa Cruz 1743/6326
UAGRM party, July 1990; 4 km SW of (1744/6328).

SAN RAFAEL DE AMBORÓ; Santa Cruz 1736/6336
AMNH, MSB, and CENETROP (with Operation Raleigh), July–Sept. 1985, 2 km S of (1737/6336), 5 km N and 8 km W of (on río Surutú), 360 m (1733/6341), 4.5 km S and 2 km E of (1739/6335), 400 m, 3 km N and 13.5 km W of (on río Saguayo), 400 m, (1734/6348), 4 km S and 13 km W of (at hunting camp), 400 m, (1739/6348); MNK party, Nov. 1987.

SAN RAMÓN; Beni 1317/6443 (USBGN)
MARU, 1963; see also Cafetal, Chaco Lejo, Lacuma, Huerrasca, Santa Teresita, Tacuaral, Santa Teresa (MARU localities designated from San Ramón); Yates and Salazar, Mar. 1993, also at Motacú, 50 km S of (1346/6437), at Lúcumo, 45 km S of (1343/6437), and 5 km S of (1319/6437).

SAN RAMÓN; Santa Cruz 1831/5930
Krumbiegel (1942b: 50), in province of Chiquitos.

SAN RAMÓN; Santa Cruz 1644/6241(USBGN)
Ibáñez, *see* La Laguna; AMNH-MSB, Aug. 1985, 10 km N of, on Estancia La Laguna (1636/6242), 250 m; MSB party, June 1990, 10 km E of (1640/6242); MNK party, Nov. 1990 to Sept. 1991; 2 km N and 10 km E of (1635/6225), 540 m, = 14 km by road NE of, at Estancia Castedo.

SAN ROSA; *see* Santa Rosa, Beni.

SANTA ANA; Beni 1345/6536 (USBGN)
MARU, 1963; AMNH, May 1965, 4 km from, on río Yacuma (1344/ 6534).

SANTA ANA; La Paz 1550/6736 (USBGN)
On río Coroico [1527/6750 (USBGN)]; Carriker, July and Aug. 1934, 670 m.

SANTA ANA; Santa Cruz 1637/6043 (Pine and Wetzel, 1975)
d'Orbigny, July 1831, Misión Santa Ana, on río Yacuma; d'Orbigny (1846, vol. 3, part 2: 172); MARU, Nov. 1966, in province of Velasco (1635/6040, MARU notes); Pine and Wetzel (1975) specimen of *Pseudoryzomys* taken in 1966. D'Orbigny visited two Santa Anas in western Santa Cruz. The first is at 1637/6043 and the second at 1843/5844 (USBGN).

SANTA ANA DE MADIDI, *see* Madidi.

SANTA BARBARA, *see* Cotapata.

SANTA CRUZ; Beni 1113/6523 (ONC)
AMNH, May 1965, 8 km N of, at Siete Islas in río Mamoré (1056/6520); AMNH, Oct. 1965, 4 km below (1110/6522).

SANTA CRUZ DE LA SIERRA; Santa Cruz 1748/6310 (MHA)
In province of Ibáñez, also known as Cercado; capital city of department of Santa Cruz; name usually abridged to Santa Cruz; d'Orbigny, Nov. 1830; Bridges, about 1840; d'Orbigny [and Gervais] (1847: 9), type locality of *Cebus fulvus* (= *Cebus apella pallidus*); I. Geoffroy Saint-Hilaire (1847), type locality of *Tolypeutes conurus* (= *T. matacus*); Waterhouse (1848: 278), type locality of *Ctenomys boliviensis*; Burmeister (1863: 167), type locality of *Chlamydophorus retusus* (= *Chlamyphorus retusus*); Gray (1865: 376), type locality of *Dasypus vellerosus* (= *Chaetophractus vellerosus*); [J. Steinbach perhaps], 1904 (specimens in Buenos Aires); Thomas (1907b, type locality of *Dasypus sexcinctus boliviae* (= *Euphractus sexcinctus boliviae*); Allen (1914b: 596), type locality of *Sciurus langsdorffi steinbachi* (= *S. spadiceus*); Lizer-Deletang, Dec. 1917; Osgood (1921: 39), type locality of *Sciurus boliviensis* (= *S. ignitus boliviensis*); McDonald, May 1922; Thomas (1923: 604), type locality of *Metachirus opossum crucialis* (= *Philander opossum canus*); Mazza, Nov. 1933; Eisentraut (1933: 48); F. Steinbach, June 1937, Sept. 1938; de la Barrera, Feb. 1955; Golbach, Jan. 1962; Becerra (MARU), 9 km N of (1743/6310), Aug. and Sept. 1966; Acasigue, Becerra, Hadden, Riddell, Villalobos, Aug. and Sept. 1966; also El Palmar road 7 km SE of Santa Cruz (1748/ 6308); Ranck, Nov. 1966, 6 km W of (1748/6313) and 15 km SW of (1754/6326); Baudoin, 1967, Feb. 1972; Anderson, Nov. 1979; Straney, December 1979, at airport and at km 7 of road to Cochabamba (1748/6314); EBD party, Aug. 1982, 15 km N of (1738/6310); Anderson and Olds, Aug. 1983, 12 km S and 8 km E of (1755/6310), 12 km S of (1754/6311), at km 5 on road toward Cochabamba (1747/6312); Riddle, July 1985, at km 7.5 on same road (1748/6314), and at km 21 on same road (1755/6321); Yoneda, Sept. 1982, 142 km N of (1629/6259); AMNH-MSB, Aug. 1984, near Santa Cruz de la Sierra; 12 km S of, 435 m (1754/6311); 10.5 km S of, 435 m (1753/6311); 8.5 km S of, 435 m (1752/6311); 22 km SW of, 500 m (1755/6319); MSB party, July and Aug. 1987, Santa Cruz Zoo (1747/6310), 15 km S of (1753/6307): Szwagrzak, Oct. 1985, owl pellets; MSB party, May and June 1988, 8 km W of (1744/6317); Santa Cruz Zoo (1747/6310); 15 km S of, at Las Lomitas, 400 m (1755/6308); 18 km S of (1756/6308); 20 km S of (1757/6309); 27 km SE of, at Brecha 3 (1758/6303); 55 km SE of, at Brecha 5.5 (1805/6250); MNK party, Aug. 1990, km 3.5 on road N of (1745/6310); AMNH-MSB party, June 1991, Santa Cruz Zoo; 15 km S of (1753/6307), at Las Lomitas, 430 m; 27 km S of (1758/6303), 1 km S and 2 km E of Brecha 3; AMNH party, Mar. 1993, at latter locality.

SANTA DIOS; Beni N.L.
MARU, 1963.

SANTA HELENA or ELENA; Cochabamba 1602/6700 (MAPA)
Mann, Sept. 1921 (USNM).

SANTA ROSA; Beni
AMNH, May 1965, 10 km N of (1133/6516); Oct. 1965, 4 km S of (1142/6516); see also río Cucharca or Trinidad. Also spelled as one word.

SANTA ROSA; Beni 1411/6653 (MAPA)
Olalla, 1938 (Lönnberg, 1939), near río Beni; Hanagarth, Oct. 1991, *Lutra* from hunter.

SANTA ROSA; Beni perhaps 1301/6511 (USBGN)
MARU, 1963.

SANTA ROSA; Chuquisaca 2036/6226 (MAPA 1980)
University of Connecticut, 8 km E of (2036/6221), or La Rosa.

SANTA ROSA; Pando 1121/6855 (USBGN)
Izawa, Dec. 1979.

SANTA ROSA; Pando 1213/6824
AMNH-MSB, Aug. 1986, settlement on left bank of río Madre de Dios; 180 m; CBF party, Oct. 1991, also in Manuripi province 8 km SO de [= SW of] (1216/6827), on río Tulapa.

SANTA ROSA; Santa Cruz 1707/6335 (USBGN)
Barquez and Ojeda, July 1975, at 800 m, 7 km N of Santa Rosa, in province of Sara, (1703/6335); Barquez and Ojeda, (1979: 84), type locality of *Phylloderma stenops boliviensis* (= *Phyllostomus stenops boliviensis*); Owen and Webster (1983: 146), type locality of *Pygoderma bilobatum magna*; EBD party, Nov. 1983, 15 km N of (1658/6335); Ibáñez (1985), 5 km S of Santa Rosa de Sara (1708/6335), and 25 km NW of Santa Rosa de Sara (1658/6349); MSB party, July 1987, 2.5 km N of Santa Rosa del Sara (1705/6335); MSB party, Feb. 1988 (obtained from local person).

SANTA ROSA, SIERRA; Tarija, *see* Itau.

SANTA ROSA DE LA ROCA; Santa Cruz 1550/6127
MSB party, June 1990; 2 km SSE of (1551/6127); 3 km S of (1552/6127); 3 km S of (1552/6127); MSB party, July 1991 (1550/6127) and 70 km N of (1535/6130).

SANTA ROSITA; Santa Cruz 1731/6311 (MARU)
Hibbs, July 1965; 3 km SW of Warnes.

SANTA TERESITA; Beni ca. 1325/6435
USNM; SE of San Ramón; as Santa Teresa; Barba, July 1966, about 20 km SE San Ramón in río Negro area.

SANTA TERESITA; Beni N.L.
Townsend, May 1991, near Trinidad, Villa Mar.

SANTIAGO; Beni 1306/6519 (MARU)
MARU, 1963; MacKenzie, Nov. 1971.

SANTIAGO; La Paz 1630/6715 (Flores, personal commun.)
Flores, Apr. 1983.

SANTIAGO; Santa Cruz 1819/5934 (USBGN)
R. Steinbach, Jan. to Mar. 1973, 700 m, in province of Chiquitos; Cook and Moore, Oct. 1984, 700 m, 4 km N and 1 km W of Santiago de Chiquitos (1818/5936); Schmitt, Schmitt, and Remsen, July 1984, 3 km by road S and 3 km by road W of (1818/5936), 700 m; Schmitt, Schmitt, and Remsen, July 1984, 24 km by road N of (1807/5937), 175 m, on río Tucavaca.

SANTO-CORAZON; Santa Cruz 1759/5851 (USBGN)
d'Orbigny, Sept. 1831, province of Chiquitos; d'Orbigny (1846, vol.3, part 2: 176); Paynter et al. (1975: 56), 277 m, NE slope of Sierra Las Sunsas (MHA).

SANTUARIO DE QUILLACAS; Oruro 1913/6655 (ACB)
Mercado and Miralles, May 1986.

SÃO LUIZ DE CÁCERES, *see* Cáceres.

SAPECHO; La Paz 1532/6720
MNLP party, July and Aug. 1989, in province of Nor Yungas.

SARA, EL; Beni 1208/6517
Añez, 18 May 1965, opposite side of river.

SARA, PROVINCIA DE; Santa Cruz 1722/6325
Coordinates given are at Portachuela; d'Orbigny, 1830s; d'Orbigny [and Gervais] (1847) type locality (by restriction, Elliot, 1907) of *Stentor stramineus* (= *Alouatta seniculus sara*), and Elliot (1910: 81), type locality of *Alouatta sara* (= *Alouatta seniculus sara*); Elliot (1907: 189), type locality of *Aotus boliviensis* (= *A. azarai boliviensis*); J. Steinbach, Sept. and Dec. 1905; Thomas (1907b: 164), type locality of *Ctenomys steinbachi* is "campo of province of Sara, near Santa Cruz de la Sierra" (this type locality was restricted to 6 km N of Buen Retiro, 300 m, by Anderson et al., 1987, because the species does not occur at Portachuela). The present-day provinces of Sara, Santiesteban, and Ichilo were all formerly parts of Sara. Sara is named Gutierrez (MAPA) on some maps. See also Santa Rosa.

SARA, RÍO; Santa Cruz 1727/6340 (USBGN)
= Grande, río; Tate (1933: 75) "nr. Buenavista, Santa Cruz."

SARAMUCHYQUI, LAKE; Beni ca. 1304/6449
Near San Joaquín; AMNH, Dec. 1964.

SARARIA; La Paz ca. 1517/6737
Creighton, June 1978, village near río Beni 2 hours by river NW of Puerto Linares, 277 m.

SARGENTO RODRIGUEZ; in Paraguay, *see* Villazon.

SAYA, *see* Salla.

SAYNANI; La Paz 1608/6806 (GPS)
MSB party, June 1993, 0.5 km E of (1607/6805), 2163 m, in río Zongo valley; 2500 m at village of Saynani.

SÉCURE, RÍO; Beni 1510/6452 (USBGN)
d'Orbigny, July 1832; d'Orbigny (1846, vol. 3, part 2: 212); Thomas (1902a: 130); CBF party, May and June 1992, see Oromomo, Puerto San Lorenzo, San Bernardo, río Curuya, río Iruplumo.

SEHUENCA; Cochabamba N.L.
Tapia, Jan. 1990; or Sehuencas in province of Carrasco.

SENANI, *see* Zongo.

SENDA, PUERTO; Beni, *see* Espíritu.

SERRANÍA, used with names such as Bellavista, Pilons, Sama, etc.

SERRANO; Chuquisaca 1906/6422
de la Barrera, July 1955 (Fonseca, 1959: 113).

SEVARUYO; Oruro ca. 1925/6652 (MAPA)
Simons, Oct. 1901; Thomas (1902b: 230), "a place I fail to identify, but not on the Pampa Aullaga," 3720 m; see also Uyuni in Potosí.

SIBERIA CLOUD FOREST; Cochabamba ca. 1748/6445
Schmitt and Cole, Apr. 1979, 101 km (by road) SE of Epizana, in the Cordillera Oriental; AMNH-MSB party, June 1991, Serranía Siberia, 11 km (by road) NW of Torrecillas (1749/6441); *see* Comarapa also.

SIERRA SANTA ROSA, *see* Itau.

SIETE CIELOS; La Paz N.L.
Solomon, June 1987, on río Manupare in province of Iturralde, 180 m.

SIETE ISLAS, CACHUELA DE; Beni 1056/6520 (RON)
AMNH, June 1964; May 1965, 7 km S of (1100/6520).

SILALA; Potosí 2201/6802 (USBGN)
Sanborn, Apr. 1924, near province Antofagosta, in Chile.

SILES, PUERTO; Beni 1248/6505 (USBGN)
MARU, 1963. AMNH, Oct. 1965; 2 km SE of (1249/6505); río Matucaré nearby (1247/6505); and 22 km S of (1259/6505).

SILLAR, EL; Cochabamba 1707/6544
EBD party, Sept. 1982, 1900 m; Ibáñez (1985), as 45 km SW of Villa Tunari, 1850 m; also used as Sillario or Puerto del Sillar.

SIRARANI; Santa Cruz N.L.
Felis concolor.

SIRCUMA, SERRANÍA; La Paz N.L.
Mercado, Mar. 1989.

SOLACAMA, RÍO; La Paz 1618/6732 (MHA: E-19)
Simons, Jan. 1901, at 1200 m and 1400 m; Thomas (1901f: 253), type locality of *Eligmodontia callosa boliviae* (= *Calomys venustus*); Thomas (1911a: 516), type locality of *Marmosa dorothea* (= *Marmosops dorothea*); Hershkovitz (1962: 166); CBF party, Oct. 1992, 14 km on road from Chulumani to Irupana; also spelled Solacame, Solocame, or Solacamo, flows together with río Unduavi to form río Tamampaya.

SONPRERITO; Santa Cruz N.L.
MNK party, Apr. 1990, in province of Andrés Ibáñez.

SORATA; La Paz 1547/6840 (USBGN)
Tate, May 1927, camp at point where automobile road crosses the río San Cristobal, 10,000 ft (= 3075 m); Olalla, July and Aug. 1938, 2647 m (Patterson, 1992: 5); Paynter et al. (1975: 58) as Sorata; Creighton, Mar. 1980, 10 km (by road) N of (1543/6840), Moyabaya, on río Challapampa, 2650 m; Mercado, Instituto de Ecología, Feb. 1980.

SUÁREZ, *see* Puerto Suárez or Nicolás Suárez.

SUÁREZ, PUERTO; Santa Cruz 1857/5751 (USBGN)
Kreig, Nov. 1926, as at 1858/5747.

[NICHOLAS] SUÁREZ ISLAND; Beni 1049/6524 (MAPA)
AMNH, June 1964.

SUCHES, RÍO; La Paz 1541/6909 (USBGN)
Cabot, 1982, owl pellets (1450/6920).

SUCRE; Chuquisaca 1902/6517 (USBGN)
d'Orbigny, Dec. 1832 to Mar. 1833; d'Orbigny [and Gervais] (1847); Simons, Sept. 1901, at 2700 m; Thomas (1902b: 223), Miller, Nov.–Dec. 1915; Hershkovitz (1962: 247); capital of department, also known as Chuquisaca.

SUCRE, PUERTO; Beni 1048/6523 (USBGN)
Kleblatt, 1925, Senckenberg (R. M. Wetzel, personal commun.); also see Guayaramerin.

SUD YUNGAS; La Paz
A province; Flores, July 1983, 2100 m (no specific place).

SUGUAGO, RÍO; Santa Cruz N.L.
J. Steinbach, Sept. 1910, Aug. 1911; see also Saguayo, possibly a variant spelling.

SUIQUI; La Paz 1625/6738 (ACB)
In province of Sud Yungas, MNLP, June 1962.

SUNCHAL; Tarija 2140/6332 (MAPA)
Eisentraut, Oct. 1979, (ZFMK), between Villa Montes and Yacuiba.

SURUTÚ, RÍO; Santa Cruz 1724/6351 (USBGN)
J. Steinbach, Aug. 1916, Mar. 1922; F. B. and J. Steinbach, Oct. 1927, at 1200 ft (= 350 m); LaVal (1973) as Suruto; ANSP (Koopman's notes); Rudolph Zischka and son, specimens in Munich; see also San Rafael de Amboró.

TABANA, LA; Beni 1450/6622
Flores, Nov. 1985, 40 km from San Borja on road to Trinidad; see also Cabaña.

TABLADA; Tarija 2133/6447 (USBGN)
Budín, Dec. 1924; Thomas (1926b: 322), 2000 m, close to the town of Tarija; Thomas (1926b: 321), type locality of *Hesperomys fecundus* (= *Calomys venustus*); Thomas (1926b: 320), type locality of *Graomys taterona* (= *G. domorum taterona*); Hershkovitz (1962: 166).

TABLAS MONTE; Cochabamba 1705/6600 (GPS)
MSB party, July 1993, 2100 m; 4.4 km by road N of, 1833 m (1704/6559); 9.5 km by road NE of, 1500 m (1702/6601).

TACACOMA; La Paz 1535/6843 (USBGN)
Olalla, at 3495 m; ca. 2500 m, Mapiri drainage (MHA).

TACUARA; Chuquisaca 2019/6349 (USBGN)
Arduz, in vicinity of Monteagudo, Aug. 1951; Hershkovitz (1962: 166).

TACUARAL; Beni ca. 1325/6435
Barba, July 1966; about 20 km SE of San Ramón.

TAHUAMANU; Pando 1102/6844
Hibbs and Kunz, Apr. 1965; "Tahumanu Cobija." The town Cobija is in the province of Tahuamanu, now called Nicolas Suárez. Kunz, Apr. 1965, Tahumanu, Camino Virtud, 10 km S of Cobija (1108/6844).

TAIPICHULLO; La Paz N.L.
Mercado, Oct. 1986.

TAJIBOS; Beni 1450/6622
Cabot, Aug., Oct., and Nov. 1983, estancia 40 km E of San Borja; see also Ingeniero Mora.

TALAPALCA; Potosí 2000/6522
A pampa; EBD party, Nov. 1982, 3700 m, coordinates are an estimate.

TALOMETA, RÍO; Santa Cruz N.L.
J. Steinbach, 1917; cited by Thorington (1985); presumably variant spelling of Palometa.

TAMBO; Santa Cruz 1758/6428 (ACB)
C. G. Schmitt and D. C. Schmitt, Jan. 1984, 2.5 km N of, in valley of río Isidro (or río Pulquina), 1500 m (1800/6428).

TAMBO; Tarija 2127/6423 (USBGN)
Budín, Feb. 1925; Thomas (1926b: 325), 2200 m, 75 km E of Tarija, type locality of *Ctenomys sylvanus mordosus* (= *C. frater mordosus*); AMNH-MSB, Sept. 1986, Rancho Tambo, 61 km by road E of Tarija, 2100 m (2127/6419), Rancho Tambo, 56 km by road E of Tarija (2127/6419), 8 km W of Ranch Tambo, 2700 m (2127/6424).

TAPACARÍ; Cochabamba 1731/6636 (USBGN)
Simons, Mar., Apr., and May 1901, at 3000 m; Thomas (1902a), type locality of *Eligomodontia domorum* (p. 132, = *Graomys domorum domorum*), and of *Phyllotis wolffsohni*; Pearson, Sept. 1955, 15 mi E of (1731/6623), at 9000 ft (= 2770 m); on río Tapacarí (MAPA).

TAPECUA; Tarija 2126/6355
AMNH-MSB party, July 1991, 1500 m.

TAPERA JORILLO N.L.
MARU, 1963. Perhaps in Beni, but this is not certain.

TAPIKIOLE;
Krumbiegel, 1940, or La Urbana, specimen of *Tolypeutes*.

TAQUESI; La Paz 1633/6755 (ACB)
Yoneda, May 1983, 3800 m, on Camino del Inca.

TAQUIÑA; Cochabamba ca. 1724/6609
J. and F. B. Steinbach, Dec. 1928, at 2700–2750 m; Pearson (1958: 434); suburb of Cochabamba.

TARABUCO; Chuquisaca 1911/6456 (ACB)
Anderson and Olds, July 1983, 3230 m; 2 km W of (1910/6455); AMNH-MSB party, July 1990, 2 km N and 3 km E of, 3250 m, (1910/6453); 2 km N of, 3250 m, (1910/6456); 3 km N of, (1909/6456); 4 km N of, 3250 m, (1908/6456); 12 km N and 11 km E of, 2450 m (1904/6449).

TARABUQUILLO; Chuquisaca 1917/6430 (USBGN)
Prince, Mar. 1965, 6 mi NW of (1913/6434), 9000 ft (= 2770 m).

TARIJA; Tarija 2131/6445 (MHA)
Canevari, July 1889; the French mission of Créqui Montfort and Sénéchal de la Grange, 1903, 1770 m; Budín, Jan. 1925, at 6000 ft (= 1845 m); Grandidier and Neveu-Lemaire (1905: 370), type locality of *Tolypoides bicinctus* (= *Tolypeutes matacus*); de la Barrera, 1955 (Fonseca, 1959: 93); Pearson, Oct. 1955, at 6700 ft (= 2060 m); Pearson, 10 mi NW of (2121/6455), 8200 ft (= 2700 m); 5 mi S of (2136/6445), 6700 ft (= 2040 m); capital of department; Crossin, Dec. 1972, Jan. and Feb. 1973, "118" km S of (2210/6445) 985 m, 67 km E of (2131/6408), 2277 m, and 108 km ENE of (2125/6353), 1969 m; Creighton, Jan. 1980, 38 km (by road) ENE of Tarija (2128/6432), 2400 m, at Carlazo; AMNH, Sept. 1986, ciudad de Tarija, 1862 m.

TARILA; La Paz 1624/6738
Simoni, Instituto de Ecología, Mar. 1979, 1980; IE, Dec. 1989; Hacienda Tarila.

TARINGUITI, *see* Villa Montes.

TATARANI; La Paz 1641/6801
Hinojosa, Salazar, and other students, Oct. 1987, 2135 m; area known also as Quebrada Capaña in province of Murillo.

TAUCA; Oruro 1933/6802 (ACB)
Mercado, 1986.

TEREBINTO; Santa Cruz 1741/6322
MNK party, 1992, 0.5 km E of (1741/6322); 2 km W of (1744/6323).

TEREMACA; Beni 1254/6421 (MARU)
Webb, 25–26 Apr. 1970, on río Itonamas.

TICUCHA; Chuquisaca 2028/6404 (USBGN)
Hershkovitz (1960: 561), on río Capirenda.

TICUNHUAYA; La Paz 1528/6818
Tate, Apr. 1926, at 5000 ft (= 1540 m), a ridgetop camp; Tate (1931b: 3), type locality of *Marmosa mapiriensis* (= *Micoureus mapiriensis*).

TIGUIPA, *see* Tiquipa.

TIHUMAYO; Chuquisaca 1934/6408 (USBGN)
Marzana and Macchiavello, PASB, Apr. 1949, 1500 m, province of Tomino, also spelled Tihumayu, Thiumayu (USBGN), Tiumayo (MAPA).

TIJAMUCHI, RÍO; Beni 1409/6457 (USBGN)
AMNH, June 1965, 2 km from mouth (1409/6457); 4 km and 5 km from mouth (1410/6458); AMNH-MSB, Aug. 1985 (1456/6509).

TINKUSIRI, *see* Totora.

TIN TIN; Cochabamba 1801/6525 (USBGN)
J. and F. B. Steinbach, Sept. and Nov. 1937; Paynter et al. (1975: 62) cite as 2150 m on upper río Mizque (MHA).

TIPOY; Santa Cruz N.L.
In province of Andrés Ibáñez.

TIPUANI; La Paz 1533/6800 (USBGN)
Paynter et al. (1975: 62) as 555 m on río Tipuani, an affluent of the Mapiri (MHA).

TIQUIPA; Chuquisaca 2055/6326 (USBGN)
Herrmann, specimens in Berlin, Tiquipa (R. M. Wetzel, personal commun.); Schmitt and Cole, May 1979, 2 km S and 10 km E of, at Laguna Palmar, 555 m (2056/6321), and in field notes as in Tarija; 50.4 km by road E of (2055/6301); 54.4 km by road E of (2055/6259); 55.2 km by road E of (2055/6258); 56 km E of (= 66 km by road, 2055/6252); 64 km E of (= 71 km by road, 2055/6248), at Bañado Yagüapua; also spelled Tiguipa.

TIRAQUE; Cochabamba 1725/6543 (USBGN)
F. Steinbach, July, Aug., and Sept. 1928, at 3200 m, at Cerro Juno; R. M. Gilmore, July 1937, 30 mi. S of (1751/ 6543); Carriker, Sept. 1937; Pocock (1940: 352), spelled as Tiraqui, type locality of *Oncifelis geoffroyi euxanthus* (= *Felis geoffroyi euxantha*); Pocock (1941a: 264), type locality of *Lynchailurus pajeros steinbachi* (= *Felis pajeros garleppi*); Pearson, Sept. 1955, 15 mi ESE of (1728/6533), at 10,500 ft (= 3230 m).

TITA; Santa Cruz 1825/6210
Petroleum camp of Occidental-Boliviano Inc., AMNH-MSB, Oct. 1984, 300 m; 5 km SE of, 295 m (1827/6208); 8 km SE of, 290 m (1828/6207); 17 km S and 5 km W of, 300 m (1835/6213).

TITICACA, LAGO; La Paz center of Lake, 1548/6924 (USBGN)
Rusby, 1885; Simons, Oct. 1900, at 4000 m (Thomas, 1911b: 256, skin labels also say Achecachi); the French mission of Créqui Montfort and Sénéchal de la Grange, 1903, "environs du lac Titicaca" (1600/6830, an approximation); Szwagrzak, 1980s, year uncertain, owl pellets (1600/6830, an approximation); Vellard (specimen in Buenos Aires), date and exact locality unknown.

TOCOMECHI; Santa Cruz
Hibbs, Aug. 1965; 15 km NW of Warnes (1724/6304).

TOCORANI, *see* Lagunillas.

TODOS SANTOS; Cochabamba 1648/6508 (USBGN)
Becker, Mar. 1915; Miller, July 1915; Osgood (1916), type localities of *Akodon dayi* (p. 208), on río Chapare at ca. 300 m; and of *Oryzomys chaparensis* (p. 205, = *Oligoryzomys microtis*); Carriker, Aug. 1937; Arce Pereira et al. (1963).

TOLA ORKO; Chuquisaca ca. 1927/6407 (USBGN)
Cors Medina, Dec. 1941 and July 1942, 40 km from Padilla in Province of Tomina at 2100 m.

TOMINA; Chuquisaca 1911/6430 (USBGN)
Gilmore, July 1943, at 2200 m, in province of Tomina; Pearson (1958: 434), 2071 m on río de Tomina (MHA); also see Monte Cantu; also spelled Tomena.

TOMONOCO; La Paz 1529/6731
Webster, 1978 (Webster and Jones, 1980), military post 2 km W of Puerto Linares, 350 m.

TONCOMA; Cochabamba 1715/6620
Olalla, Dec. 1938, 3200 m (Patterson, 1992).

TORRECILLAS; Santa Cruz
AMNH-MSB party, June 1991, 11 km by road NW of, 2650 m (1749/6441); 3 km (by road) N of (1751/6439), 2625 m.

TOTAÍ; Beni
MARU, 1963, or Estancia El Totaí, about 20 km S of San Joaquín (1315/6449); Webb, Sept. and Oct. 1969.

TOTAIZAL; Beni 1451/6621
EBD party, Oct. 1983, Oct. 1985; MNLP, Oct. 1985, 1 km SW of Porvenir; or Mato Totaizal, variously listed as 45, 50, or 55 km from San Borja; see also Estación Biológica de Beni.

TOTAITU; Santa Cruz 1600/6230
Tello, 1986.

TOTORA; Cochabamba 1742/6509 (USBGN)
d'Orbigny, Oct. 1830; F. B. Steinbach and J. Steinbach, Nov. 1926, at 2900 m; Pearson, Sept. 1955, 20 mi E of (1751/6440), 9700 ft (= 2960 m); 2603 m on río Totora, affluent of Mizque (MHA); AMNH-MSB party, June 1991, 17 km E of (1745/6502), at río Tinkusiri, 2950 m.

TOTORA, YUNGAS DE; Cochabamba 1725/6459 (USBGN)
Barquez and Olrog (1980), río Yanimayo, 80 km N of Monte Punco, 800 m and 1600 m (1725/6459); 35 km N of Monte Punco on río Yanimayo (1717/6515); 15 km N of Monte Punco at Totora (1728/6518); also spelled Jarimayo.

TOTUMU, LOS; Beni 1400/6350
Tello, 1986, on río San Miguel.

TRAPICHE, EL; Beni 1448/6619
Campamento in Estación Biológica de Beni; Hinojosa and Salazar, Dec. 1987 and Dec. 1988; Salazar, Sept. 1987, 2.5 km N of (1446/6619), 2 km E of (1448/6618); Salazar, Aug. 1989, 7 km NW of (1444/6621).

TRINIDAD; Beni 1447/6447 (USBGN)
Balzan, 1892, as Trinidad de Mojos (*Noctilio*); Thomas (1901g: 440); Becker, Mar. 1915, at 236 m; Osgood (1916: 212); Day (1916: 32); Olalla, Mar. 1938; Straney, Dec. 1979; AMNH, July 1965, 25 km NW of (1437/6500); 160 km N of (1307/6447, an approximation); Schmitt and Schmitt, Oct. 1984, 6 km by road SE of (1450/6444) 175 m, 38 km by road W of (1451/6507), 175 m; AMNH-MSB, Aug. 1985, 236 m; Olrog, Sept.–Oct. 1960; San Juan, 50 km N of (1429/6440); Santa Rosa, río Cucharca, 70 km N of (1420/6435); Monte Grande, 80 km N of (1415/longitude uncertain); La Colonial, 90 or 100 km N of (1350/longitude uncertain).

TRIUNFO, EL; Beni N.L.
Barba, Sept. 1966.

TRIUNFO, EL; Beni N.L.
A hacienda; Miranda, 1990, vicinity of EBB.

TRIUNFO, EL; Beni 1503/6630
Cabot, Oct. 1983 (28 km E and 20 km S of San Borja); Tello, Aug. 1986, an aserradero in the Chimanis Reserve.

TRIUNFO, EL; Beni 1515/6415
Heltne, Freese, and Whitesides, primate censuses, Aug. 1975 (Heltne et al., 1976: appendix I; at ranch house, on río Ibari from 2 km below to 4 km above ranch house, on both north and south sides of Laguna San José about 10 km S of the house and at about 1522/6415, and part of south and east shore of this laguna).

TUCACHA N.L.
F. B. Steinbach, May 1927.

TUCUMILLA; Tarija
AMNH-MSB party, July 1991, 1 km E of (2127/6449), 2500 m.

TUCUVACA, RÍO; also spelled Tucavaca; see Santiago, Santa Cruz.

TUJMA; Cochabamba ca. 1752/6518 (MAPA)
Miller and Boyle, 1915.

TUMICHUCUA; Beni 1113/6614
Fugler and Swing, Sept. to Dec. 1981; also spelled Tumi Chucua.

TUMULA, CERRO; Potosí 2014/6613
Créqui Montfort and Sénéchal de la Grange (1904: planche 1) collected between Pulacayo and Yura south of cerro Tumula (on some maps as Uyuni-Visicza).

TUMUPASA; La Paz 1409/6755 (USBGN)
Mann, Dec. 1922; Hershkovitz (1977: 661), also spelled Tumapasa; 436 m (MAPA); S. Anderson, J. Anderson, and P. Remsik, Sept. 1980, also locality 18 km SE of (1416/6747); Wenzel, Nov. 1987.

TUNAL, EL; Santa Cruz 1753/6433
In province of Caballero and cantón of Comarapa; Hinojosa and other students, Dec. 1988.

TUPIRIQUI; Santa Cruz N.L.
E. Vargas, Sept. 1990, in province of Vallegrande.

TUPIZA; Potosí 2127/6543 (USBGN)
Budín, Dec. 1925, at 2000 m; Thomas (1926: 194), ca 3000 m on río Tupiza, S of Oplaca (MHA); 20 mi SSE of province of Yuruma (2137/6540); Yepes and Crespo, Mar. 1941; EBD party, Nov. 1987.

TURCO; Oruro 1810/6813
Yensen et al. (1994: 409).

UBERABA, LAKE; Santa Cruz 1730/5750
Captain Page, in Exploration of Paraná, one jaguar skull at USNM.

UCHO UCHO; Cochabamba 1710/6620
Olalla, Dec. 1938, 3526 m (Patterson, 1992).

ULLA ULLA; La Paz 1503/6916 (USBGN)
Baudoin, 1971; Jungius (1974: 380), see Pelechuco, no specimens; S. Anderson and J. Anderson, Sept. 1980, at Estación Experimental, 5 km E of Ulla Ulla (1502/6913), 4460 m, and at 7 km E of (1503/6912), 4560 m; Anderson, June 1982, also at 1502/6913; Anderson, Sept. 1980, 12 km

N and 3 km W of (1456/6918); EBD party, Jan. 1982, at Arroyo Cañuma (1502/6913, exact coordinates uncertain), May 1982, at Cabaña (1502/6913); Yoneda, Jan. to Nov. 1982, at Estación Experimental; at Lago Llachokota (1508/6908); at Lago Puyu Puyu (1500/6908); also spelled Ula Ula; Cabot, Mar., Oct., and Dec. 1982, at Lago Katantica (1449/6916); Kucera, July 1982, at Estación; Cabot, Dec. 1982, at Laguna Saracocha (1507/6909); Cabot and Serrano, 1983 (Ibáñez, 1985) between the lakes Nuve and Cañuma, 4460 m, in Reserva Nacional de Fauna Altoandina de Ulla Ulla (1452/6916); collector unknown, Sept. 1983, at Lago Cololo (1452/6919); Villalba, Aug. 1989, Reserva Ulla Ulla, no specific locality; the localities with asterisks (*) that follow are all in the Reserva Ulla Ulla but exact coordinates are not known to me; Sept. 1986, at Kallapampa (*), at Mojon Collo (*), at Jahuijawira (*), and at Jiska-jahuira (*); Oct. 1989, at Cabaña-Colinas (1502/6913); Oct. 1989, Feb. 1990, Sept. 1990, at Socondori Pampa (*); 1989, at Cabaña, río Cañuma (1502/6913); Barrera, Jan. 1990, at río Tambillo (*); Villalba, Jan., Feb., Jul., and Sept. 1990, at Huancasaya (*); Mar. 1990, at Chiarkota (*); collector unknown, Jul. 1990, at Huancasaya-Chiuchimi (*); Tiurina, Aug. 1990, at [5 km E of] Ulla Ulla (1502/6913); Villalba, Sept. 1990, at Huacachani (1500/6913); Barrera, Oct. 1990, at Janka Pampa (*); Mercado, Mar. 1991 (1502/6913); Tarifa, May 1991 (*); Lairana, May and June 1992 (*).

UNDUAVI; La Paz 1619/6754 (USBGN)
Creighton, Oct. 1979, 15 km (by road) NE of (1615/6750), 2400 m; Cabot, Jan. and Feb. 1983, 50 km NE of La Paz, 3000 m.

UNDUAVI, RÍO; La Paz 1618/6801 (Tate field map)
Tate, at 8000 ft (= 2440 m) flows together with río Solacama to form río Tamampaya; AMNH-MSB party, Aug. 1992, 2500 m (1617/6751 GPS); see also Pitiguaya and Yerbani.

URUMA; Santa Cruz N.L.
F. Steinbach, Mar. 1942.

UYUNI; Potosí 2028/6650 (USBGN)
Simons, Nov. 1901, at 3670 m; Thomas (1902b: 224), type locality of *Phyllotis arenarius* (= *P. xanthopygus rupestris*); Grandidier and Neveu-Lemaire (1908: 5), type locality of *Dasypus boliviensis* (= *Chaetophractus nationi*); Carriker, Jan. and Feb. 1938; Pearson, Sept. 1955, 1 mi E of (2028/6649), 12,000 ft (3680 m), 4 mi E of (2028/6646), at 12,600 ft (= 3875 m); 5 mi E of (2028/6645); 13,000 ft (4000 m); Paynter et al. (1975: 66) on W side of Salar de Uyuni (MHA); EBD party, Nov. 1982, 5 km N of (2025/6650); Peñaranda and Rocha, Feb. through May 1993, río Sevaruyo "proximo a Uyuni," pellets of *Athene cunicularia* (1931/6651, Peñdranda, in litt.).

VACA DIEZ, *see* Riberalta.

VACAS; Cochabamba 1732/6535 (USBGN)
J. Steinbach, F. B. Steinbach, Oct. 1936, at 3800 m; Hershkovitz (1962: 254).

VACIA; Beni, *see* Espíritu.

VALENCIA; La Paz
Mercado, Oct. 1987, Jan. and Dec. 1989, June 1990.

VALLE, EL; Beni 1339/6426
An estancia; Yates and Salazar, Mar. 1993.

VALLEABOJO; Santa Cruz 1813/6353
de la Barrera, December 1954 (Fonseca, 1959: 98).

VALLEGRANDE; Santa Cruz 1830/6406 (USBGN)
Marzana and Macchiavello, May 1949, 1980 m; de la Barrera, August 1955, 1500 m, as Vale Grande or Valle Grande; Prince, La Hoyada, 30 km S Valle Grande, 1760 m (1845/6406); AMNH-MSB party, June 1991, 5.5 km (by road) NNE of (1828/6408), at río Cienega, 1800 m.

VALLES, when used as part of the name of a specific area, the word is capitalized, as in Yungas and Valles Region, but when used for valleys in a general sense, it is not capitalized.

VALPARAISO; Beni N.L.
Barba, July 1966, SE of San Ramón.

VARADOR, PUERTO; Beni 1454/6502
Anderson, Aug. 1983, one *Tamandua* only, 230 m.

VEINTE Y DOS; Beni ca. 1310/6455
MARU, 1963; as Veintodos; AMNH, June 1966, 15 km SW of San Joaquín.

VELASCO; Santa Cruz
Province of Velasco, San Ignacio is at 1623/6059.

VELIQUE, RÍO; La Paz1517/6806 (Tate fieldnotes)
Tate, Apr. 1926, small stream entering the río Mapiri from the right about 3 hours below the town of Mapiri.

VENECIA; Beni 1415/6550
Cabot, Apr. 1982, Sept. 1983, an estancia on left bank of Arroyo Maniqui.

VERMEJO, *see* Bermejo.

VERSALLES; Beni 1244/6318
AMNH, July 1964, on río Iténez.

VERTIGO, EL; La Paz 1605/6802
In valley of río Zongo, province of Murillo; Hinojosa and other students, June and July, 1988.

VIACHA; La Paz 1639/6818 (USBGN)
MCZ no. 7393, 3850 m.

VICTORIA; Pando 1059/6610 (USBGN)
A. M. Olalla, 1937, 172 m, 3 km from left bank of río Beni and about 9 km from confluence with río Madre de Dios (hence in Pando and not Beni as frequently cited, sometimes cited as confluence of these rivers only and without the name Victoria); Patterson (1992: 5); Lönnberg (1940a: 11), type locality of *Mystax imberbis* (= *Saguinus fuscicollis weddellii*); Lönnberg (1941: 40), type locality of *Aotus trivirgatus infulatus* (= *Aotus azarai boliviensis*); Lönnberg (1942: 22), type locality of *Bradypus* (*Neobradypus*) *beniensis* (= *Bradypus variegatus*); Lönnberg (1942: 49), type locality of *Dasypus kappleri beniensis*.

VICTORIA, LAGO; Beni 1346/6330 (MARU)
MARU, 1963; Acasigue and Ranck, Nov. 1966, in Iténez province, 20 km SSE of Baures.

VIDAL; Beni N.L.
D. Lopez for MNLP.

VILLA ABECIA; Chuquisaca 2100/6523 (USBGN)
Pearson, Oct. 1955, 25 mi SSE of (2119/6513, in Tarija), at 11,500 ft (= 3538 m) and 20 miles SSE of (2115/6517, in Tarija), at 8500 ft (= 2615 m), also termed Camataqui; EBD party, Nov. 1987.

VILLA BELLA; Beni 1023/6524 (USBGN)
Sanborn (1932: 182).

VILLA DORITA; Beni 1430/6614
Miranda, Aug. 1990, a hacienda near the Estación Biológica de Beni.

VILLA INGAVI; Tarija 2149/6334 (USBGN)
Borelli, prior to 1897; Thomas (1898b: 3) as Caiza, ca. 2000 ft (= 600 m), 75 mi (= 121 km) E of Tarija; Feb. 1901 (USNM) as Caiza; Thomas (1916a: 275), type locality of *Histiotus laephotis* (= *H. montanus laephotis*); as 30 km N of Yacuiba (specimen in USNM); as Caiza, *Catagonus* specimen (Eisentraut, 1986).

VILLA MAR; Beni N.L.
Townsend, 1991 or 1992, adelante de Villa Mar, Santa Teresita.

VILLA MONTE; Beni 1306/6525 (MARU)
Kunz, Apr. 1972, about 20 km NW of Exaltación, in province of Ykuma [= Yacuma].

VILLA MONTES; Tarija 2115/6330 (USBGN)
Eisentraut, 1931 (1933: 47), specimens in Berlin; Kreig, 1926, specimens in Munich (R. M. Wetzel, personal commun.); Carriker, Nov. 1936; de la Barrera, August 1955, 520 m (Fonseca, 1959: 93, as Vila Montes; Smit, 1987: 350); Cabrera (1958: 27), ca. 500 m; Schmitt and Cole, Apr. and May 1979, 8 km S and 10 km E of (2119/6325), 467 m; Eisentraut, Oct. 1979, ZFMK; Creighton, Feb. 1980, 35 km (by road) SE of (2128/6317), Taringuiti, 360 m; CBF party, Apr. 1992. See also San Francisco.

VILLA TUNARI; Cochabamba 1657/6524 (USBGN)
Creighton, May and June 1978, 50 km (by road) NW of (at Puerto Patiño, 1637/6547, 280 m), 0.5 km NE of (1657/6524), 2 km NE of (1656/6523), 2 km N of (1656/6524), 4 km SE of (1657/6522), 19 km SW of (at San Raphael, 1704/6531); Anderson, November 1979, "3" (actually about 13) km SW of (1702/6529), at 360 m; Anderson, Oct. 1980, 2 km E of (1657/6523); EBD party, Sept. 1982, 15 km from Villa Tunari on road from Cochabamba (1702/6530); Yoneda, Sept. 1982, bañado Las Posas (1657/6522); EBD party, Sept. 1982, as Balneario Las Pozas; Cabot, Oct. 1985, 60 km [SW] of Villa Tunari (1711/6549); MSB party, July 1993, 12.5 km SW of, at Parque Nacional Carrasco, Cavernas de Repechón, 500 m (1704/6529); formerly known as San Antonio; see Sillar also.

VILLAROEL, PUERTO; Cochabamba 1648/6447 (MAPA 1980)
MNLP, June 1981. Pilleri (1977b: 16) Nov. 1976, at Vita Lei, a farm.

VILLAZÓN; Potosí 2206/6536 (USBGN)
Pearson, Sept. 1955, 5 mi N of (2154/6536), at 11,500 ft (= 3540 m); 25 mi NE of (2149/6519), at 12,200 ft (= 3720 m).

VILLAZÓN; in Paraguay 2033/6217 (MAPA)
Wetzel, 1975, near Bolivian border of Chuquisaca department, also known as Sgto. Rodriguez.

VINTO; Cochabamba 1726/6619 (USBGN)
Miller and Boyle, 1915, 8600 ft (= 2645 m); 2537 (MHA).

VISCACHANI; La Paz 1712/6757 (USBGN)
Village and hot springs, Anderson and Olds, July 1983, 3780 m.

VISCACHANI, LAGO; La Paz 1612/6807 (GPS)
MSB party, June 1993, 3788 m.

WARNES; Santa Cruz 1730/6310 (USBGN)
J. Steinbach, Apr. 1915; F. Steinbach, Nov. 1938; 375 m (MHA); Hibbs and Peyton, July and Aug. 1965; Kuns, Sept. 1965; MARU, July and Aug. 1965, 1.3 km NE of, 1 km NNW of; Kerr, Hadden, and Villalobos, Aug. 1966, city in province of Warnes; Acasigue, Kerr, Villalobos, Oct. 1966, on west bank of río Piray. See also localities (MARU) measured from Warnes, namely Tocomechi, Las Barreras, Santa Rosita, La Abra, Juan Latino.

WENDÁ PATRIOTA; Santa Cruz 1740/6327
Tapia, Sept. 1990; also spelled Wanda or Huanda.

WILLACOLLO, CERRO; Potosí N.L. Aguirre, bought *Felis jacobita* skin in market, killed Dec. 1991.

XIAMAS, *see* Ixiamas.

YACUIBA; Tarija 2202/6345 (USBGN) J. and F. Steinbach, Aug. 1905; J. Steinbach, Feb. 1916; Budín, July 1924, at 600 m; Thomas (1917b: 312); type locality of *Dasyprocta variegata boliviae* (= *D. punctata boliviae*); Crossin, December 1972, about 30 km NW of (2150/6333), 831 m; CBF party, Apr. 1992, 40 km [E of] (2155/6319).

YACUMA; Beni 1510/6704 Schmitt and Schmitt, Sept. 1984, 50 km by road N of (1443/6714), 575 m, in province of General José Ballivián; IBBA (LePont), Aug. 1985, 4 km N of (1508/6705); IBBA, Feb. 1985; AMNH, MSB, and IBBA parties, Aug. 1985, 45 km N of (1442/6704); AMNH-MSB party, July 1992, 253 m, Km 35 NW of [on road to Rurrenabaque] (1452/6707 GPS); also spelled Yacumo or Yucumo.

YACUMA, RÍO 1338/6523 (USBGN) AMNH, 1965, opposite mouth (1338/6523); 2 km or 1.5 km from mouth (1338/6525); 4 km from mouth (1338/6526); 6 or 7 km from mouth (1338/6527); see also Espíritu. Also spelled Ykuma, or Yacumo.

YANACACHI; La Paz 1623/6743 (USBGN) Simons, Nov. 1900, as 3500 m; Hershkovitz (1962: 255), 2326 m; CBF, Feb. 1989.

YANAIGUA; Santa Cruz 1957/6211 RAP team, observations only, Oct. 1991 (Parker et al., 1993: 39).

YANI; La Paz 1536/6835 (USBGN) Simons, Aug. 1900, at 3500 m, as Ayane; Pearson (1958) as Ayane.

YANIMAYO, RÍO, *see* Totora.

YAPACANÍ, RÍO; Santa Cruz 1724/6346 Coordinates given are at major road crossing, not at mouth (1600/6425); Alexander, Sept. 1914; J. Steinbach, Sept. and Nov. 1914, Feb. 1915; F. Steinbach, Jul. 1938, 1945 (R. M. Wetzel personal commun., specimen in Buenos Aires), Jul. and Aug. 1947; Hershkovitz (1960: 561); Eisentraut, Oct. 1979, as río Japacaní, 125 km N Santa Cruz (R. M. Wetzel, personal commun., 2 FMK), perhaps actually NW rather than N of Santa Cruz; IBBA, Aug. 1981, see Punta Rieles; see Buena Vista also. Also spelled Japacaní.

YAPOJE, RÍO; Santa Cruz N.L. Strachan, Aug. 1987, 375 m (coordinates uncertain).

YERBANI; La Paz 1618/6754 (USBGN) Creighton, Nov. 1979, 1 km S of, at confluence of río Aceramarca and río Unduavi, 2600 m (1618/6801); an estancia, spelled Hierbani on some maps.

YOLOSITA; La Paz 1614/6745 IBBA, Jan. to Mar. 1985, in Nor Yungas Province, near Yolosa.

YKUMA, *see* Yacuma.

YUATRE; Beni 1317/6448 (MARU) MARU, 1963, or 2 km E of, 25 km SW of San Joaquín.

YUCUMO, *see* Yacuma.

YUNCAS, *see* Yungas.

YUNGA SAN JOSÉ, *see* San José.

YUNGAS; when used as a proper noun or as part of the name of a specific area, the word is capitalized, but when used in a general sense and not implying a specific forested area, it is not capitalized. See similar comments under Chaco and Valles.

YUNGAS; Cochabamba 1620/6645 (USBGN) d'Orbigny, 1847), type locality of *Lophostoma sylvicolum* (= *Tonatia sylvicola sylvicola*) is Yungas, between the ríos Sécure and Isiboro (1545/6515); Allen (1904b: 230), at 6000 ft (= 1845 m), type locality of *Artibeus rusbyi* (= *A. lituratus lituratus*); Miller and Boyle, June 1915, at 3600 ft (= 1110 m, N of Locotal, ca. 1700/6550); F. B. Steinbach, Oct. 1926, Oct., Nov., and Dec. 1927. *See* also Palmar.

YUNGAS; La Paz ca. 1610/6730 (MHA) d'Orbigny, July-Sept. 1830; d'Orbigny (1845: 140) referred to the province of Yungas including humid eastern slopes from Mapiri to Cochabamba and Beni; Gray (1867: 429), type locality of *Macroxus ignitus* (= *Sciurus ignitus*) as restricted by Allen (1889: 205) as "Yungas, Bolivia" and based on specimens of Rusby, 1885; presumably from the eastern slopes of the cordillera in Cochabamba or Santa Cruz at 18°S, however, many of Rusby's "Yungas 18°S" specimens actually are from the lower río Beni (Paynter et al., 1975: 69–70); Simons, Nov. 1900, as Yuncas, 2200 m.

YUQUI, CAMPAMENTO; Cochabamba 1648/6457 Stearman and Redford, May 1988 (Stearman, 1990; Redford and Stearman, 1993).

YURA; Potosí 2004/6608 the French mission of Créqui Montfort and Sénéchal de la Grange, 1903, 5000 m., Cerro Tumula (2014/6613, USBGN) Paynter et al. (1975: 70, as 2007/6607).

YURUMA; Potosí 2143/6534 (USBGN)
Budín, Dec. 1925, Jan. 1926, at 2200 m; Thomas (1926d: 194); Pearson, Sept. 1955, at 10,500 ft (= 3230 m), also as 20 mi SSE Tupiza; also called Estación Yuruma.

YUTI, *see* Camiri.

YUTIOLES, *see* San Joaquín.

ZANJA HONDA; Santa Cruz 1818/6312
Cook and Gardner, July 1985, 10 km S of (1823/6313), at 550 m; AMNH-MSB party, July 1991, 3 km N of (1816/6311), at Hacienda El Pelícano, 500 m.

ZAPIAL; department uncertain N.L.
Delgadillo (Pan American Sanitary Bureau) USNM, May 1942, 1700 m.

ZAPOCÓ; Santa Cruz 1633/6133
S. Davis, Nov. 1985 (as Zapocoz, 80 km SE of Concepción); Tello, 1986.

ZONGO; La Paz 1607/6802 (USBGN)
Schmitt and Cole, Mar. 1979; 30.7 km (by road) downstream from Lago Zongo, in the valley of the río Zongo, and 1.9 km (by road) downstream from Saenani, 2236 m (1555/6754). Lago Zongo is 29.6 km (by road) N of El Alto. Creighton, Sept. and Oct. 1979; 18 km (by road) N of (1604/6800), at 2767 m; 30 km (by road) N of 1553/6752), at 2000 m; Anderson, Apr. 1982, río Zongo, 1500 m (45 km by road below Lago Zongo), 1550/6745; Yoneda, Mar. 1982, 2100 m (1556/6752); MNLP, 1990s, 3060 m (1607/6802); Baptista, Apr. 1987, Zongo Valley, 2650 m (1603/6800); Peñaranda, Feb. 1992, 1880 m (1554/6749); Kessler, Aug. 1991, "15 km de abra," 3750 m (1612/6808), and "11 km from pass," 4100 m (1614/6808); see also El Vértigo and Saynani. Chincheros and Martinez, Feb. 1992, at "Centro Hidroelectrica," but which generating unit not known.

ZUDAÑEZ; Chuquisaca 1905/6445
de la Barrera, April 1955.

HISTORY OF COLLECTING

The history of discovery of mammals in South America has been summarized by various authors (e.g., Anderson, 1983b, 1991; Hershkovitz, 1987b; Baker, 1991; and Patterson, 1994). In general, large mammals and those with relatively large geographic ranges were discovered sooner.

The history of fieldwork on Recent mammals in Bolivia is herein summarized in two ways: the first chronologically and the second alphabetically by persons and institutions involved. Most of the abbreviations or acronyms for institutions that are used in this chronology, are spelled out elsewhere (see Abbreviations and Acronyms). Fieldwork and published reports relating to fossil mammals are not included, although it is interesting to note that the first such report appeared as early as 1602 (cited by Boule and Thevenin, "1920").

CHRONOLOGY

1793—Prior to 1793, Alexandre Rodrigues Ferreira traveled down the río Guaporé along the Bolivian border (Hershkovitz, 1987b), but I am unaware of any specimens of mammals that he obtained in Bolivia.

1825—Bolivia became independent.

1829—The first specimens known to me to have been obtained within the area comprising present-day Bolivia were taken by J. Natterer for the museum in Vienna. Most of his explorations were in Brazil, but some specimens may have been taken on the Bolivian or left bank of the río Iténez (as it is named in Bolivia, or rio Guaporé, as it is named in Brazil) and of the río Mamoré below the mouth of the Guaporé as Natterer traveled downriver from Matto Grosso to Porto Velho. Pelzeln (1883) reported on Natterer's work and Hershkovitz (1987b: 35) reprinted a map originally published in 1833.

1830—From 1830 to 1832, the first extended exploration of the natural history of Bolivia was conducted by Alcide d'Orbigny (1834–1847, 1835–1847). His materials in the Museum National d'Histoire Naturelle, Paris, have been subsequently studied by others. His itinerary was summarized by Pilleri and Arvy (1977, map reprinted by Hershkovitz, 1987b: 72).

1841—Wesmeal collected in Bolivia.

1845—From 1845 through 1847, Thomas Bridges collected birds for the Earl of Darby and also obtained a few small mammals for the BM (Natural History). He visited the departments of Oruro, Potosí, and Santa Cruz (Waterhouse, 1848; Thomas, 1902b; Gyldenstolpe, 1945).

1848—From 1848 until at least 1851, H. A. Weddell (1853) visited areas near La Paz and in the Yungas to Coroico and Tipuani below Sorata.

1850—Pentland collected for the BM.

1885—In 1885 and 1886, H. H. Rusby collected in Bolivia (Rusby, 1933).

1890s—A. Borelli collected in the Gran Chaco (Thomas, 1898b).

1892—Chacón (1892) published a summary of the mammals of Potosí. I have cited a few of his reports when species identification was relatively certain, when specific provinces were mentioned, and when information cannot be documented by more recent and better records. Chacón probably did not study any museum specimens.

1897—In 1896 and 1897, G. and O. Garlepp obtained a small series of mammals while collecting birds for Count von Berlepsch at Esperanza about 50 km from Mount Sajama (Thomas, 1898a; Niethammer, 1953).

1900—In 1900 and 1901, P. O. Simons collected for the BM in Cochabamba, Potosí, and La Paz.

1903—P. O. Simons collected in Cochabamba (Chubb, 1919, summary of Simon's localities).

The Mission de Créqui-Montfort et le Sénéchal de la Grange worked in Bolivia.

1904—In 1904 and 1905, an expedition led by Baron E. Nordenskiöld collected in Beni. Holmgren (1906) gave localities.

1908—E. L. Arribalzaga collected for the MACN.

1909—In 1909, J. D. Haseman obtained some specimens at San Matías; these are now in the CM and FM.

1910—Prior to 1910, J. Steinbach prepared mammals in Santa Cruz for various museums. Many specimens were from near his home in Buenavista. He also collected in Cochabamba and in Tarija. His latest specimens were prepared in 1938. Beginning in 1926, his son, F. B. Steinbach, collected in Cochabamba, Tarija, and La Paz until at least 1953. His son, Roy Steinbach, collected a few mammals in later years, at least up to 1973.

1913—J. Seré acquired one specimen of *Lama* for the MACN.

1915—L. E. Miller and H. S. Boyle obtained mammals and G. K. Cherrie collected birds for AMNH on the Collins-Day Expedition in Cochabamba. Miller and Cherrie had accompanied Theodore Roosevelt in his expedition to Brazil in 1914 (Miller, 1918).

1917—C. Lizer and L. Daletang collected in Santa Cruz for the MACN.

1920—Boule and Thevenin published a monograph on fossils from Tarija, including two species that still inhabit Bolivia and representatives of a number of taxa now extinct. They mentioned that in 1602 Diego de Avalón y Figueroa announced the discovery of many fossil bones in the region of Tarija. It is unclear whether any such specimens were preserved or might have included any taxon still living in Bolivia.

1921—In 1921 and 1922, W. M. Mann collected for the Mulford Expedition (Mann, 1925; MacCreagh, 1926).

1924—From 1924 to 1926, E. Budín, of Tucumán, collected in Tarija and Potosí for the BM (Thomas, 1925, 1926b, 1926d).

1925—R. Scherrer collected along the río Beni but exact localities are unknown; specimens are in the MACN.

In 1925 and 1926, the German Gran Chaco Expedition visited Tarija and Santa Cruz. Hans Krieg accompanied the expedition in Tarija, Chuquisaca, and Santa Cruz and collected mammals (Krieg, 1931, 1948).

K. Kleblatt deposited specimens from 1925 in the Senckenberg Museum.

1926—G. H. H. Tate collected 1552 specimens in La Paz for the AMNH. Boom (1981) published a map of Tate's itinerary.

1929—The Ottley-Anthony Expedition (AMNH) visited Bolivia; H. E. Anthony prepared 35 specimens.

1932—Daveron (or Daverson?) collected in both 1932 and 1935.

1933—M. Doello Jurado collected in La Paz and S. Mazza collected in Santa Cruz for the MACN.

1934—From 1934 to 1938, M. A. Carriker, Jr., collected birds and a few mammals for the ANSP (Bond and de Schauensee, 1942).

1936—J. Yepes collected at Sococha (department uncertain).

1937—In 1937 and 1938, A. M. Olalla collected in Beni, Pando, Cochabamba, and La Paz (Gyldenstolpe, 1945; Patterson, 1992).

1938—O. Silva collected in Bolivia.

1939—In 1939 and 1943, Dr. R. Cors Medina, head of the Bolivian Servicio Anti-pestoso, with Gilmore collected about two dozen mammals in Chuquisaca. These are now in the USNM.

1941—J. Yepes and J. A. Crespo collected in La Paz and Potosí.

1943—R. M. Gilmore spent a month in Bolivia with an International Bubonic Plague Commission and collected a few dozen mammals, mostly in southeastern Bolivia. These are now in the USNM.

1945—R. Zischka collected in Bolivia in 1945, 1954, 1960, 1961, and 1962. Specimens are in Munich.

1948—Guillermo Mann F., from Chile, collected at Rurrenabaque, Reyes, and other localities; he discussed ecological factors and presented numerous photographs of habitats and animals (Mann, 1951).

1951—A. Prosen collected at Buena Vista for the MACN.

G. Niethammer collected in La Paz for the A.

Koenig Museum, Bonn, Germany (Niethammer, 1953).

1954—In February, C. Gans collected at Carmen, Beni.

From at least October 1954 to July 1955, de la Barrera collected at 20 localities in Chuquisaca, Cochabamba, Santa Cruz, and Tarija (between 17°17′ and 21°47′S and between 63°17′ and 68°09′W; Fonseca, 1959).

1955—O. P. Pearson collected at several Bolivian localities in connection with his studies of the genus *Phyllotis* (Pearson, 1958).

1957—C. C. Olrog obtained an otter skull for the IML Tucumán.

In 1957, S. C. Bromley and K. E. Stager, from the LACM, collected in Chuquisaca and Tarija.

1958—Monres collected in the yungas near Locotal in Cochabamba.

1959—C. C. Olrog collected in Cochabamba and Santa Cruz for the IML.

1960—C. C. Olrog collected in Beni department for the IML.

1962—Apostol collected in the yungas near Locotal in Cochabamba.

Golbach collected at Santa Cruz de la Sierra.

L. Arce P. led a commission exploring the río Mamoré; some mammals were noted, but no known specimens were collected. Useful descriptions of habitats, human activities, and soils were provided and numerous photographs taken (Arce Pereira et al., 1963).

1963—In 1963, two major programs were initiated, one by the MARU, headed by Dr. M. L. Kuns, and one by the AMNH, headed by Dr. R. G. Van Gelder.

The first program was a series of epidemiological studies of hemorrhagic fever in Beni that followed a severe outbreak in San Joaquín and nearby areas (Johnson et al., 1965, 1967; Steele, 1994). The MARU conducted studies in collaboration with Bolivian agencies and personnel until at least 1972. Names of participants are in the list of collectors. The collections are in the FMNH and the USNM. Most of the work was in the department of Beni, but significant collections were made in Santa Cruz, and smaller numbers of specimens were taken from the La Paz and Cochabamba departments.

The second major program (1963–1966) was organized by the AMNH to collect mammals and their ectoparasites with support from the U.S. Army Medical Research and Development Command. Significant collections of other groups of vertebrates and of nonparasitic insects were obtained also on these expeditions, chiefly along the Mamoré and Iténez rivers in Beni.

1964—In 1964 and 1965, F. M. Prince and J. Trusta collected in Chuquisaca and Santa Cruz. Specimens are at the CAS and the MVZ.

Specimens were collected in Santa Cruz by "Apostol."

1968—In February, G. Pilleri (1969a, 1969b) collected *Inia* in the río Ibare west of Trinidad in Beni.

1969—Jungius (1971, 1974) studied the ecology of Andean deer in northern La Paz and helped survey the potential for national parks in Bolivia. I have seen no specimens that he prepared.

Abel Fornes collected at Apolo for the MACN.

Dr. R. Pujol, was a member of the UNESCO mission to inventory the flora and fauna of the Parque Nacional de Mont Sajama.

1971—O. P. and A. K. Pearson collected at several localities to obtain specimens for a karyological study (Pearson and Patton, 1976).

1975—R. A. Ojeda and R. M. Barquez collected bats near Santa Rosa in Santa Cruz for the AMNH and the IML in Tucumán (Barquez, 1977; Barquez and Ojeda, 1979; Ojeda and Barquez, 1978).

1976—C. C. Olrog and G. Olrog collected bats in the Yungas of Totora in Cochabamba for the IML (Barquez and Olrog, 1980).

G. Pilleri (1977a, 1977b) collected at ríos Ichilo, Ipurupuru, and Mamoré.

1978—In 1978, 1979, 1980, G. K. Creighton of the University of Michigan in Ann Arbor collected several hundred specimens in several departments in pursuing his doctoral study on the systematics and distribution of the genus *Marmosa*. In 1978 and 1979 he was accompanied by his wife, Alexandra Snyder.

In 1978 and 1979, D. C. Cole and C. G. Schmitt of New Mexico spent about 6 months in several departments collecting mammals for the AMNH and birds for the Delaware Museum of Natural History.

1979—In 1979 and 1980, D. O. Straney collected bats in Beni and Santa Cruz.

In 1979, S. and R. J. Anderson responded to an invitation from Gastón Bejarano on behalf of the Bolivian government and spent one month on a reconnaissance of La Paz, Oruro, Potosí, Tarija, Chuquisaca, Santa Cruz, and Cochabamba. They obtained 34 specimens.

In 1979, the Kyoto University Second Primatological Expedition in South America worked in western Pando (Kondo, 1980; Shimizu and Imai, 1980; Mino, 1980; see also papers by Izawa and Yoneda).

In 1979, 1980, and 1981, J. Van Remsen, ornithologist from the LSUMZ, collected more than 400 bats in La Paz.

Hans Krieg was in Villa Montes in 1979.

1980—In August, R. H. Pine and P. A. Remsik

Fig. 481. Dugout canoe near Costa Marques, Brazil (1228/6417), at start of a trip up the río Machupo, August 1964. From left to right are the Uruguayan mammalogist Alfredo Ximenez, the physician David Youngblood, Daniel Eduardo Añez of San Joaquín, the marinero Agusto Vaca of Guajaramerin, John Lussenhop and John Bouseman, entomologists from the University of Illinois, and the engineer Jorge Parador of Guajaramerin.

collected in Santa Cruz and were then joined by S. and R. J. Anderson for work in Beni. After Pine and Remsik left Bolivia, the Andersons collected in La Paz and in Cochabamba, this expedition yielding 600 mammals.

J. Castroviejo was at Estancia Venecia in Beni.

1981—In 1981 and 1982, C. M. Fugler, a herpetologist from North Carolina, collected under a grant from the Fulbright Program and obtained some mammals for LSU.

José Cabot and P. Serrano, from October 1981 to December 1986, studied birds in all departments except Pando and Tarija and collected some mammals.

J. Van Remsen obtained about 350 bats in 1981 in La Paz.

M. Yoneda obtained a cat specimen for the MNLP from Saya in La Paz.

1982—In April, May, and June, S. and R. J. Anderson obtained about 360 specimens from La Paz and Pando.

From 8 to 17 September, C. Ibáñez, F. Brasa, A. Andreu, and R. Lafitte worked in La Paz and Cochabamba.

From 4 to 28 November, parties organized by the Instituto Nacional Fomento de Lanero (INFOL) and the EBD, including C. Ibáñez, F. Braza, A. Jimenez, J. Cabot, C. Carballo, J. Ayarzagüena, P. Serrano, R. Lara, H. Alzerreca, and E. Flores, collected in the departments of Chuquisaca and Potosí. A. Jimenez was a preparator.

1983—In July and August, S. and R. J. Anderson and N. Olds obtained about 160 specimens from Chuquisaca, Beni, Oruro, Cochabamba, and La Paz.

In September, E. Flores collected on the río Blanco in Beni.

From September to December, A. M. Stearman studied wildlife used by the Yuquis in Cochabamba. Later work was done in other years, at least up to 1991.

From 21 October to 11 November 1983, C. Ibáñez, F. Braza, José Cabot, Juan Miguel Cabot from EBD, and F. Hiraldo and J. Lobon from MCN, Madrid, collected in Beni and Santa Cruz.

1984—From 29 February to 23 March, J. M. Cabot (brother of José Cabot) collected in Beni, for the EBD. From June 1984 through October 1985, V. Castello, M. Corvillo, and J. E. García did ecological fieldwork and some collecting in the Beni for the EBD.

In August, September, and October, a joint field party from the AMNH and the MSB, including at various times S. Anderson, J. A. Cook, D. L. Moore, S. L. Gardner, T. L. Yates, N. Olds, E. Flores, and R. J. Anderson, obtained about 1200 specimens from Oruro, Beni, Cochabamba, and Santa Cruz. This was the first of 3 years of work under two grants from the U.S. National Science Foundation (BSR-83-16740 and BSR-84-08923).

While collecting birds for LSU from January through October, C. G. Schmitt and D. C. Cole Schmitt also obtained about 250 mammals in Beni, Cochabamba, Santa Cruz, and Oruro for the AMNH. In July, J. Van Remsen prepared a few mammals in Santa Cruz for the AMNH.

M. Yoneda, E. Flores, and K. Izawa collected this year but no details are available.

A specimen of *Myrmecophaga* was obtained at Santa Cruz de la Sierra for the IML of Tucumán.

1985—In July, August, and September, an AMNH-MSB field party, including at various times S. Anderson, J. A. Cook, H. Cuenca A., A. W. Dickerman, S. L. Gardner, O. C. Jordán, N. Olds, I. Mercado T., B. R. Riddle, L. A. Ruedas, J. Salazar B., and T. L. Yates, obtained about 1500 specimens from Beni, Chuquisaca, La Paz, and Santa Cruz. R. Urgel and M. O. Bismark from CENETROP joined the group for a few days in Santa Cruz to collect samples for parasitological study, as did P. Desjeux, F. Le Pont, W. R. Cuna, and E. Valette from IBBA.

In September, E. Flores obtained a skull of *Tayassu* from Humaita in Pando.

In November, E. Flores obtained a skull of *Tayassu* from the Estación Biológica de Beni.

S. E. Davis collected in Santa Cruz in 1985 and 1986.

1986—Between 3 July and 12 October, AMNH-MSB parties, including at various times S. Anderson, J. A. Cook, A. W. Dickerman, S. L. Gardner, O. C. Jordán C., C. K. Malcolm, J. Miralles G., N. Olds, L. A. Ruedas, J. Salazar B., K. J. Schuster, W. A. Talbot, T. Tarifa S., and T. L. Yates, obtained about 1300 specimens from Beni, Chuquisaca, La Paz, Oruro, Pando, Potosí, and Tarija.

F. LePont collected a few specimens in the Alto Beni for IBBA in several different months.

Between 20 August and 24 September, parties from the EBD and the Santa Cruz Zoo, including at various times F. Braza, A. Castillo, J. Castroviejo, M. Corvillo, J. Ernesto García, C. Ibáñez, M. Lopez, V. Uríos, and I. Varela, collected in Santa Cruz, in the Huanchaca area and later in the Chaco. García was a preparator. Prof. Noel Kempff Mercado and two associates were murdered on one of these expeditions.

Collections were made for CENETROP, IBBA, LSU, and SNCFHB, but details have not been obtained.

J. L. Tello studied the status of the Felidae in Beni and Santa Cruz from 6 June through 17 October and obtained 285 specimens of mammals that were deposited in the MNK in Santa Cruz (Tello, 1986).

1987—In June, G. W. Graffin and J. C. Solomon obtained two specimens on the río Manupare in Pando.

In July and August, an MSB party, led by J. A. Cook and including at various times P. Bettella, M. L. Campbell, A. Castillo U., N. S. Cook, P. L. Ford, B. J. Hayward, R. L. Humphrey, A. Moscoso V., and J. Salazar B., collected 250 specimens in Santa Cruz.

Instituto de Ecología parties that included J. Salazar B., I. Mercado T., J. Miralles G., V. Baptista, and L. A. Pacheco collected in Beni and La Paz.

D. E. Wilson, U.S. Fish and Wildlife Service, visited the EBB with J. Salazar B. and others in September and collected about 102 specimens.

S. Anderson and J. Anderson collected about 180 specimens in Santa Cruz in October and November with others from CENETROP, UAGRM, and the Parque Zoológico in Santa Cruz.

From August 1987 to August 1988, E. G. Marquez and F. Holgado collected specimens in Santa Cruz that are now in the MNK.

From 1987 to 1989, the biologist L. Pajuelo de la Maya worked in Santa Cruz; specimens are at EBD and MNK.

1988—In January, F. Hinojosa obtained a specimen of *Tayassu* from EBB.

In May and June, J. A. Cook led in Santa Cruz an MSB party that included at various times M. D. Carreño, F. W. Davis, E. Guzmán A., L. Guzmán, B. J. Hayward, J. C. Herrera F., J. Salazar B., E. Vaca, and D. Vaca S.

In August, F. Gómez D. and J. Salazar B. collected in vicinity of EBB in Beni.

In August and September, J. Cabot and C. Urdiales collected in Santa Cruz, Cochabamba, and Oruro departments for the EBD.

In August, a party from Durham University studied in Santa Cruz (Dunstone, 1988).

K. H. Redford and A. M. Stearman worked with the Yuqui Indians in Cochabamba and obtained some 70 skulls from hunters.

1989—M. Canevari, R. Carrizo, G. Daneri, and M. Vinas collected in Tarija for MACN.

In March, C. Tapia collected at Parque Amboró.

In June, F. Alvarado obtained a cat for CBF from Achiri in La Paz.

In July and August, an MNLP party, including J. Aparicio, E. Pérez, R. A. Medellín, and F. Aguirre, collected in the provinces of Nor Yungas and Sud Yungas in La Paz.

1990—In January, R. Specht collected at Espíritu in Beni and C. Tapia at Sehuencas.

In March, C. Tapia collected at Campamento II in Cochabamba.

In May and June, a RAP team of Conservation International (L. H. Emmons, field numbers 741 to 762, and F. Hinojosa, field numbers 303 to 366) visited areas near Alto río Madidi, Ixiamas, and Apolo, in La Paz (Emmons, 1991).

In June, July, and August, an AMNH, MSB, and UAGRM party, including at various times R. J. Anderson, S. Anderson, J. C. Cenzano, J. A. Cook, R. L. Cuellar S., S. L. Gardner, J. C. Herrero F., O. C. Jordán C., E. Luna-Pizarro Q., E. Palma, R. H. Pine, J. Salazar B., M. C. Tapia A., L. F. Tercero C., R. Wood, T. L. Yates, L. M. Zalles, collected about 1000 specimens in Santa Cruz and Chuquisaca. This was the first of 4 years of work under grants from the National Science Foundation (BSR-90-15454, BSR-89-20617, INT-92-12839, and BSR-90-24816).

In July and August, J. Sarmiento and M. Yoneda collected near Ixiamas in La Paz.

In August, C. Miranda M. collected armadillos in Beni.

In September, C. Tapia collected at Wendá Patriota in Santa Cruz.

In October, Paynter [initials unknown] collected at EBB.

1991—MNK parties, including at various times F. Abasto, M. Bustamante, R. Colque, J. Cuellar G., C. Eulert, M. G. Flores, J. C. Herrera, E. Luna-Pizarro, R. S. Miserendino, L. Maffei, F. Morales, S. Ortiz, H. Rosales, A. M. Saavedra, L. Sanchez, J. L. Santivañez, and C. Tapia, collected near Basilio, Terebinto, and Pailón, also in 1992.

In January, March, August, and November, an MNK party led by M. Zalles collected at the Estancia Castedo, 2 km N and 10 km E (or 14 km by road NE) of San Ramón. The party variously included E. Guzmán, J. C. Herrera F., L. Maffei F., R. S. Miserendino S., N. Rocha, J. L. Santivañez G., and M. C. Tapia A. At least 144 specimens of mammals were obtained.

In March, I. Mercado obtained skulls of *Lama* for CBF from Ulla Ulla.

In March and April, A. M. Stearman collected at a Yuqui village on the río Chimoré in Cochabamba.

In March and April, W. Townsend, with R. Mateo, L. Mateo, M. Mendoza, and W. Melgar, collected at Ibieto in Beni.

In April, A. Szwagrzak collected owl pellets at Trinidad, Beni.

From May into August, a field party (AMNH and MSB in collaboration with MNK and CBF), including at various times L. F. Aguirre U., S. Anderson, M. L. Campbell, J. A. Cook, N. S. Cook, F. Davis, J. L. Dunnum, S. García H., S. L. Gardner, J. F. Guerra S., O. C. Jordán C., M. A. Lucero S., E. Luna-Pizarro Q., P. F. Méndez R., C. P. Miranda M., R. Miserendo, A. Nuñez Q., E. Palma, E. M. Peñaranda B., S. G. Rocha O., L. A. Sainz B., J. A. Salazar B., K. S. Smith, M. C. Tapia A., R. J. de Urioste V., R. J. Várgas M., T. L. Yates, collected some 1770 specimens in Cochabamba, Santa Cruz, and Tarija.

In October, CBF acquired a *Mazama* skull from E. Herrada, obtained at Paquicha in La Paz.

In October, a CBF party including L. F. Aguirre, R. J. Vargas, R. de Urioste, F. Guerra, and E. Peñaranda collected in Pando.

1992—In January, E. Peñaranda collected owl pellets at Huaraco, and in February he collected in the Zongo Valley. Both localities are in the La Paz department.

In May and June, a CBF party including F. Guerra, R. F. Méndez, A. Nogales, S. Nosa C., S. Otazu, C. Paz R., K. S. Smith, J. Vargas, and I. Yubanure Y collected in the TIPNIS.

An MNK party, including L. Maffei F., worked near Monteagudo, month uncertain.

In June and July, a field party (RAP of Conservation International), including L. H. Emmons and K. S. Smith, collected and observed at seven localities in Pando.

From June into August, a field party (AMNH and MSB in collaboration with MNK and CBF) included at various times S. Anderson, N. C. Bernal H., M. Blair, S. V. Brant, M. L. Campbell, M. E. Capra S., J. L. Dunnum, B. Flores L., S. L. Gardner, H. Gómez C., E. Jiménez M., E. Luna-Pizarro Q., M. Parrado C., J. R. Peralta T., J. A. Salazar B., C. M. Santalla Z., M. M. Subieta F., R. Tejada S., T. Tiurina, D. Vaca S., and M. J. Wike. Some 770 specimens were collected in Beni, Santa Cruz, and La Paz.

From June into October, an MNK party with the PRBN collected at several localities in northern Santa Cruz. Included in the party were E. Cuellar, C. Tapia, L. Painter, R. Wallace, J. L. Santivañez, R. S. Miserendino S., and A. Torrico. Work continued into 1994.

In October and November, a CBF party collected at several localities in the Sajama region. The party consisted of T. Tarifa S., K. S. Smith, E. Yensen, and Amparo Lucero.

1993—In the months from February through May, E. Peñaranda and O. Rocha collected owl pellets near the río Sevaruyo in Potosí and at Huaraco-Antipampa in La Paz.

In March 1993, T. L. Yates, J. Salazar B., and C. J. Peters collected near San Ramón in the Beni.

From May into August, an MSB party led by T. L. Yates, in collaboration with AMNH, CBF, and MNK, collected in La Paz and Cochabamba. Included at various times in the party were E. Aliaga R., N. C. Bernal H., S. V. Brant, M. Bustamante C., M. L. Campbell, M. A. Chavez, J. A. Cook, J. Cuellar G., J. L. Dunnum, D. Duszinski, W. L. Gannon, S. L. Gardner, P. Marquet, R. S. Miserendino S., J. Peralta T., T. W. Perry, S. C.

Puerach, J. M. Rojas, B. R. Uzeda, J. Salazar B., C. T. Seaton, and T. L. Yates.

In general, specimens obtained after March 1993, other than those from this expedition, are not included in this publication.

PERSONS AND INSTITUTIONS

This list includes names of persons known to have collected or prepared Bolivian specimens of Recent native mammals. Briefly summarized are years, regions visited, associated persons or expeditions, numbers of specimens, literature references, and other information. Additional persons whose names have been preserved within the scientific nomenclature used for Bolivian specimens are also listed. The names of some institutions that have sponsored expeditions, that house Bolivian specimens, or that need cross-referencing within this list are given as well. See also the list of abbreviations and acronyms for collections housing Bolivian specimens and acronyms used for several projects or expeditions. Names are given in as much detail as is known to me. The names are arranged in letter-by-letter order.

Abasto, F.: student with MNK party in 1991–1992.

Acho, Berdino: May 1938, at Orion.

Adcock, Victoria: former student of R. H. Pine, one *Platyrrhinus helleri*, August 1970, from Puerto San Francisco, in USNM.

Aguirre Urioste, Luis Fernando: student in La Paz; with MNHN party in 1989; March 1990 in Santa Cruz; CBF, with AMNH-MSB party in Pando in August 1991 (field numbers 25–62); with CBF party in October 1991; studied bats at Espíritu in 1992.

Aliaga Rossel, Enzo: student in La Paz, with an expedition from the MSB in 1993 (field numbers 30–74).

Allen, Joel Asaph, 1838–1921: curator at the AMNH, after whom *Bassaricyon alleni* was named.

Alvarado, Freddy: obtained *Felis* skull for the Museo Nacional de Historia Natural (MNHN) in 1989.

Alzérreca, Humberto: from the Instituto Nacional Fomento de Lanero (INFOL); with EBD party in November 1982.

American Museum of Natural History (AMNH or AM): New York.

Andersen, Knud Christian, 1867–?: Danish zoologist who worked on bats at the BM (Natural History) from 1904 to 1918 when he disappeared (Hill, 1990: 30); after whom *Artibeus anderseni* was named.

Anderson, Ratia Justine, b. 1930: wife of S. Anderson; actively participated in several expeditions as noted below.

Anderson, Sydney, b. 1927: curator at AMNH, New York; 22 August to 11 November 1964 and 28 August to 15 November 1965 with expedition in Beni (field numbers 5276–5796 and 5798–6392); 14 October to 14 November 1979 with Ratia Justine Anderson (field numbers 6623–6666) in Oruro, Tarija, Chuquisaca, Santa Cruz, and Cochabamba; 18 August to 9 October 1980 with R. J. Anderson, R. Pine, and P. Remsik (field numbers 6684–7121) in Beni, Cochabamba, and La Paz; 22 April to 5 June 1982 with R. J. Anderson (field numbers 7128–7505); 4 July to 29 August 1983 with R. J. Anderson (field numbers 7550–7884) and N. Olds; 28 July to 25 October 1984 (field numbers 7885–8600) with AMNH party; 1985 from 6 July to 15 September 1985 (field numbers 8601–9067) with AMNH-MSB party; 3 July to 31 August 1986 (field numbers 9100–9456) with AMNH-MSB party; 2 October to 18 November 1987 (field numbers 9550–9757) with AMNH-CENETROP party; 28 June to 13 August 1990 (field numbers 9900–10383), 26 June to 29 August 1991 (field numbers 10384–10788) with AMNH-MSB party; 28 June to 7 August 1992 (field numbers 10789–11009); after whom *Marmosa andersoni* was named.

Añez, Daniel Eduardo: San Joaquín, Beni; worked with MARU on hemorrhagic fever study in San Joaquín; then with AMNH expedition in 1964, 1965, and 1966; cataloged 567 specimens.

Anthony, Harold Elmer, 1890–1970: curator AMNH, Ottley-Anthony Expedition of 1929 (field numbers 3256–3291).

Aparicio E., Les James: for the IE, August 1989.

Apostol, Ince: in Santa Cruz in 1962 and 1964 for the MACN.

Arauz, J.: collected at Tacuara in Chuquisaca; mentioned by Hershkovitz (1962: 166).

Arce Pereira, Lucio: engineer who led a commission to explore the río Mamoré, reported some mammals; no specimens known (Arce Pereira et al., 1963).

Argandoña, Luz: for the MNK, donor of bat, August 1990.

Arribalzaga, Enrique Lynch: in 1908, for MACN.

Ayarzaguena, José: with field party of the EBD in November 1982.

Azara, Felix de, 1746–1811: Spanish army engineer and naturalist who worked for years in Paraguay (Hershkovitz, 1987b: 59); after whom *Simia Azarae* (= *Aotus azarai*), *Dasyprocta azarae*, and *Didelphis azarae* were named.

Balzan, Luigi: collector for Museo Civico, Genoa; obtained the type of *Oryzomys* (*Oecomys*) *mamorae* at "Mosotenes" (= Mosetenes) in Cochabamba in 1892, Thomas (1906: 445); "Yungas and Missiones, on the Upper Mamoré" (Thomas, 1900c: 139). Cited as Luis Balzan in Spanish translations of his works (Balzan, 1893).

Barker, P. R.: specimens in UMMZ from Mt. Chacaltaya.

Barquez, Ruebén M.: Tucumán, Argentina; collected bats for AMNH and IML in 1975 at Santa Rosa, Santa Cruz; accompanied by R. Ojeda.

Barrera, José Maria de la: Argentine epidemiologist; collected in Bolivia for the Oficina Sanitaria Panamericana in Cochabamba, Chuquisaca, Santa Cruz, and Tarija in 1954 and for MACN in 1955; ectoparasites reported by Fonseca (1959).

Barrero, Soraya: with field party of the CBF in October 1991.

Baudoin, Mario: studied at UMMZ, localities in La Paz, Beni, and Santa Cruz, 1967 through 1972; later director, IE in La Paz.

Becerra, Giselle: with MNK party in May 1992.

Becker, Robert H.: with the Collins-Day Expedition in 1915 for the FMNH (Osgood, 1916); for whom *Eumops bonariensis beckeri* was named.

Berlepsch, Count Hans Freiherr von, 1857–1933: ornithologist; after whom *Akodon berlepschii* was named.

Bernal Hoverud, Nuria Cecilia: student in La Paz; April 1992 at Isla del Sol; CBF, with AMNH-MSB party in July 1992 (field numbers 16–36); with MSB party, 1993 (field numbers 40–65).

Berrero S.: October 1991 in Pando.

Bettella, Paolo: entomologist at MNK in Santa Cruz; accompanied Cook party in July and August 1987 and Anderson party in October and November 1987.

Bismark, M. D.: technician at CENETROP; with AMNH-MSB party in 1985 (field numbers 1–24).

Blair, Michelle: Peace Corp volunteer; at CDC, with AMNH-MSB party in July and August 1992 (field numbers 7–14).

Blosseville, M. de: French officer who obtained the specimen named *Vespertilio blossevillii*.

Borelli, Alfredo: University of Torino, Italy, collected at San Francisco Mission on the Pilcomayo, at Caiza in the Chaco, Aguirende Mission in the Chaco, and at río Apa on the Upper Paraguay (Thomas, 1898b: 1).

Boyle, Howarth S.: with Miller in Cochabamba in 1915.

Brandt, Tilda: after whom *Sturnira tildae* was named in appreciation of her help in translating German literature.

Branick, Count Constantin: of Warsaw; after whom *Dinomys branickii* was named.

Brant, Sara Vanessa: undergraduate student at the UCD; with AMNH-MSB party in July and August 1992 (field numbers 15–207, mostly parasites); with MSB party in 1993 (field numbers 240–480, mostly parasites).

Braza, Francisco: with EBD parties in 1982, 1983, and 1986.

Briceño, S.: the collector after whom *Mazama bricenii* was named.

Bridges, Thomas: "Mr. Bridges, nearly sixty years ago, had skimmed its eastern borders" ("the barren and desolate country forming the provinces of Oruro and Potosí, and to Sucre"; Thomas, 1902c: 222).

British Museum (Natural History) (BM): London.

Bromley, Stephen C., b. 1938–: collected with Stager in 1957.

Budín, Emilio: from Tucumán, Argentina; collected for the BM from 1924 into 1926 in Tarija and Potosí (Thomas, 1925, 1926b); on the Spedan-Lewis Expedition; after whom *Akodon budini* was named.

Burmeister, Karl Hermann Konrad, 1807–1891: director of the museum of natural history in Buenos Aires, after whom *Burmeisteria* was named.

Bustamante Corrales, Magaly: student in Santa Cruz; with MNK parties in 1991 and 1992; 1993 MSB party (field numbers 4–50).

Cabot, Juan Miguel: brother of José; collected in Beni in 1983 and 1984 for EBD.

Cabot Nieves, José: ornithologist; October 1981 to December 1986, studied birds and also collected mammals in Bolivia with several EBD parties; August and September 1988 with Carlos Urdiales in Santa Cruz, Cochabamba, and Oruro.

Calle, R.: obtained *Chaetophractus nationi* for CBF in 1992.

Calle, Santos: obtained *Felis* skins for CBF in 1992.

Campbell, Mariel L.: student at UNM and UCD; with MSB party, July and August 1987 (field numbers 28–187 included nine mammals prepared); with AMNH-MSB party May to August 1991 (field numbers 746–1273, mostly parasites but included 43 mammals); with AMNH-MSB party July and August 1992 (field numbers 1229–1354, mostly parasites but included 10 mammals); with 1993 MSB party (field numbers 1276–1305, 2200–2543, others unnumbered, mostly parasites).

Candia, Raul: Bolivian foreman with the MARU group studying hemorrhagic fever at San Joaquín, who contracted the fever and died there; collector of one of the two specimens of the rare rat, *Kunsia tomentosus*, from San Joaquín and vicinity.

Canevari, Marcelo: 1989 in Tarija for MACN.

Capra Seoane, María Elena: student in La Paz, with AMNH-MSB party in July 1992 (field numbers 1–13).

Caracciolo, H.: after whom *Vampyrops caraccioloi* (= *Vampyrodes caraccioloi*) was named (Thomas, 1893a: 186).

Carballo, Celso: with EBD party in 1982.

Carles, E. De: naturalist at the museum in Buenos Aires, after whom *Platygonus* (*Parachoerus*) *carlesi* was named.

Carnegie Natural History Museum (CNHM or CM): Pittsburgh, Pennsylvania.

Carreño Urgel, María Dolores: student in Santa Cruz; with Cook party in 1988 (field numbers 1–49); AMNH-MSB party in July 1991 (field numbers 420—472).

Carriker, Melbourne A., Jr.: collected for ANSP in 1936, 1937, and 1938; after whom *Chrotopterus carrikeri* (= *Tonatia carrikeri*) was named.

Carrizo, Rodolfo: in 1989 in Tarija for MACN.

Castello, Vicente: with EBD party in 1984 and 1985.

Castelnau, Francis compte de, 1812–1880, and M. E. Deville: expedition collected in the department of Chuquisaca.

Castillo Urioste, Abel: 1986, for MNK in Santa Cruz and with EBD party to Huanchaca area; 1987 for MNK; with MSB party in July 1987.

Castroviejo, Javier: EBD, 1980 at Estancia Venecia and with Huanchaca Expedition in 1986.

Centro de Datos para la Conservación (CDC): La Paz.

Centro Nacional de Enfermedades Tropicales (CENETROP): Santa Cruz de la Sierra, specimens in 1985–1987.

Cenzano, Juan Carlos: botany student at the UAGRM; with AMNH-MSB party in July 1990.

Chapman, Frank Michler, 1864–1945: ornithologist at the AMNH, after whom *Eptesicus chapmani* was named.

Cherrie, George Kruk, 1865–1948: collected birds with the Collins-Day Expedition for the AMNH (Osgood, 1916; Cherrie, 1930).

Chincheros, Jaime: in Zongo Valley in February 1992.

Cole, Donna Christine: New Mexico; collected with C. G. Schmitt in La Paz, Oruro, Tarija, Chuquisaca, Santa Cruz, and Cochabamba in 1978 and 1979; also with Schmitt in 1984.

Colección Boliviana de Fauna (CBF): formed in 1991 under a convenio between the Instituto de Ecología and the Museo Nacional de Historia Natural, La Paz.

Collins, Major Alfred Morris: sportsman of Bryn Mawr, Pennsylvania, cosponsor of and participant in the Collins-Day Expedition; after whom *Rhipidomys collinus* was probably named, although the author (Thomas, 1925: 578) did not mention the source of the name.

Collins-Day Expedition: of the FMNH in 1915 (Osgood, 1916); collectors Becker and Cherrie, see also Miller and Boyle.

Colque, R.: student with MNK party at Pailón and Basilio in 1991–1992.

Commissaris, Larry R., d. 1961: student at the University of Arizona, after whom *Glossophaga commissarisi* was named.

Condori, Jorge: donated *Hippocamelus* to CBF in 1992.

Conover, Boardman: ornithologist, FMNH; after whom *Ctenomys* (*Chacomys*) *conoveri* was named.

Conservation International (CI): conducted RAP expeditions, with L. Emmons as mammalogist, in La Paz in 1990, in Santa Cruz in 1991, Pando in 1992, and in the Chaco in 1992 (Parker et al., 1993).

Constant, Mrs.: in commemoration of her late husband's memory, donated the collection including the type specimen *Marmosa constantiae* (= *Micoureus constantiae*), which was named after her in 1904.

Convention on International Trade in Endangered Species (CITES).

Cook, Joseph A., b. 1958: initially a graduate student at UNM, Museum of Southwestern Biology; member of AMNH-MSB parties, August to October 1984 (field numbers 1255–1480), July to September 1985 (field numbers 1482–1576), and September and October 1986 (field numbers 1605–1659); led MSB-MNK party in July and August 1987 (field numbers 1725–1812), July and August 1988 (field numbers 1850–1956); with AMNH-MSB parties in June and July 1990 (field numbers 2101–2156) and May and June 1991 (field numbers 2189–2222); with 1993 MSB party (field numbers 2533–2568). In 1990, on the staff of the UAF.

Cook, Nella Sanchez: member of MSB-MNK party of July and August 1987 (field numbers 18–20).

Corro, J.: with F. Guerra, April 1992.

Cors Medina, Roberto: head of Bolivian Servicio Anti-pestoso; obtained about two dozen mammals in Chuquisaca.

Corvillo, M.: with EBD party in 1986.

Coues, Elliot, 1842–1899: North American mammalogist and ornithologist, after whom *Tylomys couesi* (= *Rhipidomys couesi*) was named.

Creighton, G. Kenneth: graduate student UMMZ; 1978, 1979, and 1980 (field numbers 17–466, 874–1401); with L. Snyder in 1978 and 1979.

Créqui-Montfort, George compte de: French archaeologist and linguist; Mission Scientifique, with E. Sénéchal de la Grange; 1903, in Argentina, Bolivia, Chile, and Peru, medical, physiological, and anthropological.

Crespo, Jorge A.: Argentine mammalogist; in La Paz and Potosí in 1941; with J. Yepes, for MACN.

Crossin, R. S.: FMNH, primarily ornithological collecting in Santa Cruz, Tarija, and Chuquisaca in 1972 and 1973.

Cuellar, E.: student with MNK party at Basilio in 1991–1992.

Cuellar Gorgora, Jenny: with MNK party near Pailón in November 1992; with MSB party, 1993 (field numbers 1–32).

Cuellar S., Rosa Lenny: student MNK, with AMNH-MSB party in June, July, and August 1990 (field numbers 1–89).

Cuenca Aguirre, Humberto: with hemorrhagic fever study groups in 1970s and AMNH-MSB party in 1985; head of the SNCFHB.

Cuvier, Georges Leopold Dagobert, Baron, 1769–1832: French zoologist and statesman after whom *Lagotis cuvieri* (= *Lagidium cuvieri*) was named in the year after his death.

Dabbene, Roberto: conservator of zoology in Buenos Aires, after whom *Eumops dabbenei* was named in 1914.

Daneri, G: collected in Tarija for MACN.

Darwin, Charles Robert, 1809–1882: after whom *Mus* (*Phyllotis*) *darwinii* was named.

Daveron, Alexander: along the Brazilian border, 1932 to 1936, specimens at the USNM.

Davies, Mr. J. N.: collector of the holotype, after whom *Micronycteris daviesi* was named.

Davis, Forrest W.: graduate student at UNM, with Cook party in 1988 (field numbers 312–368); AMNH-MSB party, May to August 1991 (field numbers 763–944).

Davis, Susan E.: ornithologist from Iowa State University; collected mammalian skulls in Santa Cruz in 1985 and 1986, specimens in CBF; wife of the botanist Tim Killeen.

Day, Lee Garnett: importer in New York and member of the Explorers Club; cosponsor of the Collins-Day Expedition; after whom *Akodon dayi* was named.

Deletang, Luis: in Santa Cruz in 1917, with Lizer for MACN.

Delgadillo, Wilfredo: bacteriologist with Bolivian Servicio Anti-pestoso; specimens in FMNH by 1950.

Delgado, Elisio: *Felis jacobita*, May 1988.

Deutschen Gran Chaco Expedition: 1925 and 1926.

Dickerman, Allan W.: graduate student UNM; member of AMNH-MSB parties in 1985 (field numbers 235–326) and 1986 (field numbers 329–406).

Dinelli, L.: collector in Argentina after whom *Myotis dinellii* was named (Thomas, 1902f: 493).

Doello-Jurado, Martín: professor and director of the museum of natural history in Buenos Aires; in La Paz in 1933 for MACN.

Doñana: parties from the EBD, in Sevilla, Spain, at various times from 1982 through 1986.

Doria, G.: specimen from Reyes, Beni, in BM prior to 1906.

Dunnum, Jonathan Lee: with AMNH-MSB party, May to August 1991 (field numbers 170–392); with AMNH-MSB party, July and August 1992 (field numbers 402–452); with 1993 MSB party (field numbers 676–745).

Durham University: 1987 expedition (Dunstone, 1988), observations, but no specimens known to me.

Eisentraut, Martin, 1902–1994: 1930, 1979, in Tarija (Eisentraut, 1983).

Emmons, Louise H.: USNM, with F. Hinojosa on RAP expedition of Conservation International to northern La Paz department in 1990 (field numbers 741–762); visited the Huanchaca area in Santa Cruz in 1991 (field numbers 764–784); in Pando with another RAP team in July 1992 (field numbers 832–908).

Empresa Nacional de Energia (ENDE).

Estación Biológica de Beni (EBD): various collectors since 1986.

Estación Biológica de Doñana (EBD): Sevilla, Spain; fieldwork in several departments in years 1982–1987.

Eulert, C.: student with MNK party at Pailón in 1991–1992.

Flores Llampa, Betty: MNK, with AMNH-MSB party in July and August 1992 (field numbers 20–33).

Flores, Eliana: MNLP; with various EBD and AMNH/MSB parties in November 1982, 1983, 1984, 1985.

Flores, M. Guisy: student with MNK party at Terebinto in November 1992.

Ford, Paulette L.: student UNM; with MSB party, July and August 1987 (field numbers 133–196).

Fornes, Abel: Argentine mammalogist after whom *Oryzomys fornesi* was named; collected in Bolivia in 1969.

Foster, Mr. W.: collector of holotypes, after whom *Trichomys fosteri* and *Monodelphis fosteri* were named.

Frerking, Walter: obtained *Chlamyphorus retusus* for National Geographic Society in 1948 (now in USNM).

Friggens, Miguel: Peace Corps volunteer, near Monteagudo, May and June 1992.

Fugler, Charles M.: herpetologist from North Carolina, 1981.

Gabbi, W. M.: collector in Costa Rica, after whom *Bassaricyon gabbii* was named.

Gannon, William L.: collections manager, UNM; with 1993 MSB party (field numbers 594–723).

Gans, Carl, b. 1923: American herpetologist; in Beni in 1954.

García, J. Ernesto: with EBD party in 1986.

García Herbás, Santiago: technician at CENETROP; with AMNH-MSB party in July and August 1991 (field numbers 1–80).

García Marquez, Ernest: with MNK party in Santa Cruz in 1987 and 1988.

García Yuste, Juan Enrique: graduate student; EBD; studied monkeys and collected at EBB, 1984 to 1986; with Huanchaca and Chaco expedition in 1986.

Gardner, Scott L., b. 1956: parasitologist; member of AMNH-MSB parties, August and September 1984, July 1985, and September and October 1986; UNM; with AMNH-MSB parties in June and July 1990, June and July 1991 (field numbers SLG500-91 to 610-91), and June to August 1992 (field numbers SLG100-92 to 250-92); with 1993 MSB party. In 1990, moved to the UCD; in 1994, moved to the University of Nebraska.

Garlepp, Gustav, 1862–1907: was murdered in Paraguay; in 1896 and 1897 collected a small series of mammals while collecting birds for Count von Berlepsch, all taken at an elevation of 4000 m in the puna, an area without trees and partly covered with low bushes and short grass, at Esperanza about 50 km from Mount Sajama (Thomas, 1898a: 277); after whom *Phyllotis garleppi* (= *Galenomys garleppi*) and *Nectomys garleppii* were named.

Garlepp, Otto, 1864–19??: lived to at least 89 years of age (Niethammer, 1953: 205); younger brother of Gustav, at Sajama in 1896 and 1897.

Geoffroy Saint-Hilaire, Étienne, 1772–1844: Professor of Zoology, Museum d'Histoire Naturelle, Paris; after whom *Inia geoffrensis*, *Anoura geoffroyi*, and *Felis geoffroyi* are assumed to have been named.

Gibson, Ernest: "for the help he has given in the collecting-trips of Messrs. Grant, Kemp, and Budin" (Thomas, 1918: 192); after whom *Sylvilagus brasiliensis gibsoni* was named.

Gilmore, Raymond Maurice, b. 1907: North American zoologist; collected in June and July 1943 for International Bubonic Plague Commission in southeastern Bolivia; specimens at USNM.

Goeldi, Emile [also known as Emilio] August, 1859–1917: director of the Goeldi Museum, Pará, Brazil; after whom *Midas goeldii* (= *Callimico goeldii*) was named.

Golbach, B.: at Santa Cruz de la Sierra in 1962.

Gómez Cervero, Luis Humberto: CBF, with AMNH-MSB party in July 1992 (field numbers 1–13).

Gómez, Francisco: MNHN, at EBB in 1988.

Goodfellow, [initials unknown]: after whom *Ctenomys goodfellowi* was named.

Gordon, Samuel C.: deposited a squirrel and an Andean cat skin in Philadelphia (ANSP).

Graffin, G. W.: with Solomon in Pando in 1987.

Guerra Serrudo, Juan Fernando: student in La Paz, December 1989 in Santa Cruz; with AMNH-MSB party in August 1991 (field numbers 21–84); with CBF party in October 1991; May 1992 in Tarija; November 1992 in Santa Cruz; with TIPNIS party in 1992.

Guzmán A., Edilberto: MNK student of ornithology; with Cook party in 1988 (field numbers 1–85); November 1990 and January 1991 near San Ramón.

Guzmán Ortíz, Luis: student UAGRM, with Anderson party in November 1987; with Cook party in 1988 (field numbers 10–61); July and August 1988 in Santa Cruz; August and December 1989 at San Borja; October 1991 in Pando; April 1992 in Tarija; November 1992 in Santa Cruz.

Hanagarth, Werner: ecologist; IE, August 1985, Espíritu.

Harada, Masashi: in 1984 worked in Bolivia. Japanese mammalogist who worked on bats.

Hart, Mr. J. H.: superintendent of the botanic gardens in Trinidad (West Indies), after whom *Artibeus hartii* was named.

Haseman, John Diedrich, 1887–: specimens in Carnegie Museum and FMNH, June 1909, at San Matías in Santa Cruz.

Hayward, Bruce Jolliffe, b. 1928: Silver City, New Mexico; 1987, collected in Santa Cruz with MSB party, July and August 1987 (field numbers 8639–8753); May and June 1988 (field numbers 8785–8939).

Heath, Dr.: three bats from the Beni River presented to the ANSP by E. D. Cope in 1900; at one time Heath proposed a canal to connect the río Madre de Dios and río Acre in western Pando.

Heller, Edmund: after whom *Vampyrops helleri* (= *Platyrrhinus helleri*) was named.

Herrera Flores, José Carlos: student at UAGRM; with Cook party in 1988 (field numbers 1–13); with AMNH-MSB party in June, July, and August 1990 (field numbers 90–163); with MNK party near San Ramon, January to April 1991; with MSB party in May 1991 (field numbers 192–212); with MNK party at Terebinto in 1991–1992.

Herrmann, (initials unknown): in 1926, for the Berlin Museum, on the Pilcomayo.

Hinojosa, Flavio: MNLP; at EBB in 1988; in the Yungas of La Paz in 1989; with L. H. Emmons in 1990.

Hiraldo, Fernando: with EBD party in October and November 1983.

Hoffmann, Dr.: in Costa Rica; after whom *Choloepus hoffmanni* was named.

Holgado, Felipe: with MNK party in Santa Cruz 1987 and 1988.

Humphrey, Rosanne L.: with MSB party, July and August 1987 (field numbers 29—59).

Ibáñez, Nelson: obtained *Cyclopes* at San Carlos, November 1989.

Ibáñez Uargui, Carlos J.: with Doñana parties in 1982, 1986, and 1987.

Institute Royal des Sciences Naturelles de Belgique, Brussels (IRSB).

Instituto Boliviano de Biología Altura (IBBA): La Paz, 1985 and 1986.

Instituto de Ecología (IE): La Paz, founded in 1979 by the Universidad Mayor de San Andrés (UMSA) in La Paz and the University of Göttingen in Germany; see also CBF.

Instituto Geográfico Militar (IGM): Bolivia.

Instituto Miguel Lillo (IML): Tucumán, Argentina.

Izawa, Kosei: studied ecology and behavior of primates in Pando, made a small collection in 1979.

Jacobita Mantegazza: daughter of Paolo Mantegazza who donated the type specimen to the museum in Milan and after whom the species *Felis jacobita* was named.

Jelski, M. Constantin: "well-known Polish traveler" (Thomas, 1884: 447), after whom *Akodon jelskii* (= *Chroeomys jelskii*) was named.

Jiménez, Antonio: with EBD party in November 1982.

Jiménez Montero, Elena: student at Santa Cruz; with AMNH-MSB party in July and August 1992 (field numbers 2–24).

Jordán Camacho, Otto Carlos: director of Santa Cruz Zoo; with AMNH-MSB parties in 1985, 1986, 1987, 1990, and 1991.

Jungius, H.: studied deer and vicuña (Jungius, 1971, 1974).

Kalinowski, Celestino: after whom *Gracilinanus kalinowskii* was named.

Kalinowski, J.: at Chulumani, 1896; after whom *Mormopterus kalinowskii* was named.

Kappler, A.: collected in Surinam; after whom *Dasypus kappleri* and *Peropteryx kappleri* were named.

Keays, H. H.: after whom *Oryzomys keaysi*, *Myotis keaysi*, and *Thylamys keaysi* (= *Marmosops noctivagus keaysi*) were named.

Kessler, Michael: botanist studying *Polylepis*, August and September 1991, collected mammals at several localities in La Paz, Cochabamba, and Potosí.

Kleblatt, K.: specimens in Senckenberg Museum, 1925.

Koopman, Karl Friedrich, b. 1920: curator AMNH; 20 June to 25 August 1964 and 27 June to 25 July 1965 with expedition in Beni (field numbers 461–684 and 773–936).

Krieg, Hans, 1888–1970: 1926, Deutschen Gran Chaco Expedition, in Tarija, Chuquisaca, and Santa Cruz; itinerary in Krieg (1931, 1948), other reports by Krieg (1927, 1929a, 1929b, 1930, 1939, 1940) and by Krumbiegel (1940a, 1940b, 1940c, 1940d, 1940e, 1941a, 1941b, 1941c, 1941d, 1942a, 1942b, and 1943).

Kuns, Merl L.: in charge of MARU, Panama, which studied hemorrhagic fever in Beni; after whom *Kunsia* and *Monodelphis kunsi* were named.

Ladew, Harvey S.: of New York and Maryland, sponsor of and participant in expedition with G. H. H. Tate to Bolivia in 1926; after whom *Thomasomys ladewi* was named.

Laffitte, Rafael: with EBD party in 1982.

Lairana, Valeria: May and June 1992 at Ulla Ulla; September 1992 at Caranavi.

Langsdorff, (initials unknown): after whom *Sciurus langsdorffi* was named.

Lara, Raul: from GEOBOL; with EBD party in November 1982.

LaVal, Richard K.: after whom *Thyroptera lavali* was named.

LePont, François: French entomologist with IBBA, 1985 and 1986.

Lewis, J. Spedan: sponsor of the Spedan Lewis Expedition; after whom *Ctenomys lewisi* was named.

Libermann, Maximo: Isla del Sol in 1986.

Lilienfeld C., Mario D.: student in La Paz; with MSB field party in 1993.

Lizer, Carlos: in Santa Cruz in 1917, with Deletang, specimens in Buenos Aires.

Lobon, Javier: with EBD party in October and November 1983.

Lockwood, Charles: of Buenos Aires, who expedited the work of the collector E. Budín and after whom *Graomys lockwoodi* was named.

Lopez, M.: with EBD party in 1986.

Los Angeles County Museum (LACM): California.

Louisiana State University Museum of Zoology (LSUMZ or LSU): Baton Rouge.

Lucero Sainz, María Amparo: student at UMSA, with AMNH-MSB party in July 1991 (field numbers 4–17); with CBF party, April 1992 in Tarija; October and November 1992 in Sajama region.

Luna-Pizarro, Emma: student of parasitology, UAGRM; with AMNH-MSB parties in June, July, and August 1990 (mammal field numbers 10–30); July and August 1991 (mammal field numbers 61–69); with MNK parties at Terebinto, Basilio, and Pailón in 1991–1992; with AMNH-MSB party in August 1992 (field numbers 905—1029, mostly parasites) in Beni and La Paz; MNK, study of rodents and parasites in Santa Cruz, May and June 1992, March 1993.

Macchiavello, A.: collected with Marzana; see below.

Maddren, A. G.: collected *Sylvilagus* in 1924.

Maffei Fagales, Leonardo: student in Santa Cruz; April 1990 at La Forestal; with MNK party near San Ramón, November 1990 to September 1991; with MSB party in May 1991 (field numbers 21–55); with MNK party at Terebinto and Basilio in 1991–1992; near Monteagudo in 1992.

Malcolm, Carol K.: undergraduate student at UNM; with AMNH-MSB party in July and August 1986 (field numbers 120–325).

Mann F., Guillermo: Chile; collected with Prof. Luis Capurro and deposited material in the Instituto de Pedagogico (Mann, 1951). I have not seen the material.

Mann, William M., 1886–19??: zookeeper and entomologist from Washington, D.C.; collected in 1921 and 1922 with Mulford Expedition.

Marconi, María R. de: IE and CDC; August 1981 at Huaraco.

Marquet, Pablo: Chilean graduate student at UNM; with 1993 MSB party.

Martinez, Omar: in Zongo Valley, February 1992.

Marzana, Dr. Roberto: collected with Macchiavello for PASB, 1949, in Chuquisaca and Santa Cruz.

Mateo, Levi: with Townsend in 1991.

Mateo, René: with Townsend in 1991.

Mazza, Salvador: in Santa Cruz in 1933 for the MACN.

McConnell, F. V.: naturalist in British Guiana, "who was generous enough to provide the means of Mr. Quelch's expedition, and to give the whole of his mammal collection to the National Museum" (Thomas, 1901d: 145); after whom *Oryzomys macconnelli* and *Mesophylla macconnelli* were named.

McDonald, Robert: collector of a mountain lion from Santa Cruz at UMMZ in 1922.

Medellín, R. A.: IE in July 1989.

Melgar, Wilson: with Townsend in 1991.

Méndez R., Fabiana: student at UMSA, at Irupana in April 1987; with AMNH-MSB party in July 1991 (field numbers 3–46); with TIPNIS party in 1992.

Mendoza, Mariano: with Townsend in 1991.

Menschwitz, Herman: a specimen of *Cyclopes* put in USNM in 1937.

Mercado Tudor, Isabel D.: MNHNLP, joined Anderson party in July, August, and September 1985 (field numbers 50–339); for IE in 1986 and 1989; November 1990, Palos Blancos; for CBF in 1991.

Michigan State University (MSU): East Lansing.

Middle America Research Unit (MARU): headed by Merle L. Kuns, studied hemorrhagic fever from 1963 to 1972. Most specimens (FMNH, USNM) catalogued under Kuns; other names on one or more specimens included Agosto Abaroma, Melchor Acasigue V., Silvario Barba, Lucio Bea, Fructo Becerra, Gastón Bejarano, Pedro Candia, Raul Candia, Piru Dorado, Donald R. Hadden, John Hibbs, W. Kent Kerr, R. MacKenzie, Adelio Melgar, Sevenno Mercado, Angel Muñoz, M. Ovirese, Roca Ovirese, Ralph Payton, E. Perrogia, Gary L. Ranck, John and Nancy Riddell, Luis Rivera, Cesar Salazar, Velarde, R. Vilchez, Rafael Villalobos, Patricia Ann Webb. Some of these were scientists and others were local helpers.

Miller, Leo Edward, 1887–1952: collected with Boyle in Cochabamba in 1915.

Minezawa, Mitsuru: Japanese geneticist; studied primates in Santa Cruz (Minezawa and Valdivia Borda, 1984a, 1984b).

Miralles Goytia, Jacqueline: student in La Paz; with AMNH-MSB party in September–October 1986 (field numbers 10–46); for CBF in 1988.

Miranda Moreira, Carmiña Patricia: student in La Paz; collected armadillos for IE in 1990; with AMNH-MSB party in August 1991 (field numbers 89–137).

Miserendino S., Romer Salvador: student in Santa Cruz; with MNK party near San Ramón, November 1990 to August 1991; with AMNH-MSB party in July 1991 (field numbers 63–120); September 1991 at Parque Noel Kempff Mercado; with MNK party at Terebinto, Basilio, and Pailón in 1991–1992; January 1992 at Ibiato; October 1992 at La Chonta; with PRBN party in 1992; with 1993 MSB party (field numbers 215–232).

Moll, A. A.: specimens of *Calomys* from Santa Cruz put in USNM in 1939.

Monres, F.: Yungas de Locotal in 1958.

Montero, Humberto: MNK, December 1988.

Moore, Dwight L.: graduate student; UNM, member of AMNH-MSB party, September to October 1984 (field numbers 1180–1262).

Moore, W. E.: a marmoset in Philadelphia from "Bolivia"; an *Alouatta* in USNM from río Napo.

Morales, Fatima: with MNK party, November 1992.

Mulford Expedition: 1921–1922, Mann was collector.

Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (MACN): Buenos Aires.

Museo de Historia Natural "Noel Kempff Mercado" (MHN-NKM or MNK): founded in 1987 at the Universidad Autonoma "Gabriel Rene Moreno" (UAGRM) in Santa Cruz; named in honor of Prof. Noel Kempff Mercado who was murdered in the field in the Serranía Huanchaca.

Museo Nacional de Historia Natural (MNLP): La Paz; established by the Academia Nacional de Ciencias de Bolivia in 1980; in 1991 the research collection merged with that of the Instituto de Ecología to form the Colección Boliviana de Fauna.

Museum of Southwestern Biology (MSB): University of New Mexico, Albuquerque; expeditions jointly with AMNH and Bolivian institutions in 1984, 1985, 1986, 1990, 1991, 1992, and 1993; and others led by J. A. Cook in 1987 and 1988 and by T. L. Yates in March 1993.

Nation, W.: "well-known naturalist . . . of Lima" (Thomas, 1894a: 70), after whom *Dasypus nationi* (= *Chaetophractus nationi*) was named.

Natterer, Johann, 1787–1843: Viennese explorer in Brazil, collected the type specimen of *Callithrix brunea* (= *Callicebus brunneus*), presumably in Brazil, at the Cachoeira da Bananeira on the río Mamoré; however Hershkovitz (1963a: 22) thought that "the distributional pattern of the race, indicates that the type almost certainly originated on the Bolivian side of the river" in Beni. Natterer's work along the Bolivian border in 1829 was reported by Pelzeln (1883).

Niceforo María, Brother: collector of the holotype of *Micronycteris nicefori*, after whom it was named in 1949.

Niethammer, Gunther, and J. Niethammer: 1951, in La Paz for A. Koenig Museum, Bonn (Niethammer, 1953).

Nogales, Adrian: CBF party in May and June 1992.

Nogales, Gonzalo V.: March 1990 at Ulla Ulla.

Nordenskiöld Expedition: 1904, 1905, in northern La Paz department; led by the ethnographer Baron Erland Nordenskiöld, 1877–1932.

Nosa C., Santiago: CBF party in May and June 1992.

Nuñez Quiroz, Angela: student in La Paz; with AMNH-MSB party in August 1991 (field numbers 4–21); with TIPNIS party in 1992; April 1992 in Tarija.

Ojeda, Ricardo: Tucumán, Argentina; collected bats for AMNH and IML in 1975 at Santa Rosa, Santa Cruz; accompanied by R. Barquez.

Olalla, A. M.: collected in Beni, Cochabamba, La Paz, and Pando in 1937 and 1938. Gyldenstolpe (1945) described the first part of this expedition; Patterson (1992) reported on Olalla's material also; after whom *Callicebus olallae* was named.

Olds, Nancy: graduate student in New York and member of AMNH parties in 1983, 1984 (field numbers 150–488), 1985 (field numbers 484–833), and 1986 (field numbers 834–990).

Olrog, Claës Christian, 1912–1985: collected in 1957; 1959 in Cochabamba and Santa Cruz; 1960 in Beni; 1976 in the Yungas de Totora in Cochabamba, with Gunilla Olrog (Barquez and Olrog, 1980).

Operation Raleigh: party at San Rafael de Amboró in 1985; later Raleigh International, 27 Parsons Green Lane, London SW6 4HZ.

Orbigny, Alcide Charles Victor Dessalines d', 1802–1857: Museum of Natural History, Paris; 1830 to 1832 in Bolivia; itinerary summarized by Pilleri and Arvy (1977); after whom *Andalgalomys pearsoni dorbignyi* was named.

Ortíz, Shirley G.: with MNK party at Terebinto in 1991–1992.

Osgood, Wilfred Hudson, 1875–1947: mammalogist at the FMNH Chicago, after whom *Felis osgoodi*, *Phyllotis osgoodi*, and *Monodelphis osgoodi* were named.

Otazú, S.: with TIPNIS party in 1992.

Ottley, Gilbert: sponsor of Ottley-Anthony Expedition of 1929.

Painter, L.: with PRBN party in 1992.

Pajuelo de la Maya, Luis: Spain; at Puerto Almacen in Santa Cruz in September 1987 and January 1988; specimens are at the MNK.

Palma, R. Eduardo: Chilean graduate student at UNM; with AMNH-MSB parties in July and August 1990 (field numbers 172–243); May to August 1991 (field numbers 300–358).

Pan American Sanitary Bureau (PASB).

Parnell, O.: collected bats in Jamaica, after whom *Phyllodia parnellii* (= *Pteronotus parnellii*) was named.

Parrado Cueto, Marcelo: CBF, with AMNH-MSB party in July and August 1992 (field numbers 1–57).

Paynter, [initials unknown]: at EBB in 1990.

Paz Ribera, Clea: CBF party in May and June 1992.

Pearson, Oliver Payne: b. 1915: curator at MVZ, University of California, Berkeley; collected in Bolivia in 1955 and 1971 accompanied by Anita K. Pearson (field numbers 4159–4237, 4264–4342, 4955–4963); after whom *Graomys pearsoni* was named.

Peñaranda Barrios, Efrain Miguel: student in La Paz; with AMNH-MSB party in July and August 1991; with CBF party in Pando in October 1991; in Zongo Valley in February 1992; February through May 1993, collected owl pellets at río Sevaruyo near Uyuni in Potosí and in June 1991 at Huaraco-Antipampa in La Paz.

Pentland, John Barclay, 1797–1873: British Consul General, collected in 1850 at the Desaguadero River (Thomas, 1911b:256, 1917a:158).

Peralta Téllez, Jaime R.: student in La Paz; with AMNH-MSB party in July 1992 (field numbers 1–11); MSB party, 1993 (field numbers 12–30).

Pérez, Esther: IE, August 1989.

Perry, Travis W.: graduate student at UNM; with 1993 MSB party (field numbers 139–178).

Peurach, Suzanne "Suzy" Christine: undergraduate student at UNM; with 1993 MSB party (field numbers 399–566).

Pilleri, Georg: Swiss anatomist; studied *Inia* near Trinidad in Beni in 1968 and 1976 (Pilleri, 1969a, 1969b, 1972, 1977a, 1977b).

Pine, Ronald H.: b. 1938: with P. A. Remsik in July and August 1980 in Santa Cruz and in Beni (field numbers 7000–7099), see Anderson also; and in July 1990 in Santa Cruz and Chuquisaca (field numbers 15068–15115).

Popelaire de Terloo, Baron: after whom *Mastonotus Popelari* (= *Myocastor coypus popelairi*) was named (Wagner, 1842c: 37).

Pratt, Mr. A. E.: after whom *Myoprocta pratti* was named.

Prince, Frank Marion, b. 1907: U.S. Public Health Service; in 1964 and 1965 in Chuquisaca and Santa Cruz; specimens in MVZ and CAS.

Projecto Ríos Blanco y Negro (PRBN): MNK party in 1992.

Prosen, Alberto: in 1951, for MACN.

Pujol, R.: from Laboratoire d'Ethnozoologie, Paris; in 1969 with UNESCO mission to Mount Sajama.

Quiroga, Carmen: September 1987, at Irupana.

Raleigh International: see Operation Raleigh.

Rapid Assessment Program (RAP): see Conservation International.

Reballedo, Pamela: January 1991, capybara.

Redford, Kent H.: University of Florida; May 1988 at campamento Yuquí.

Reig, Osvaldo: Argentine mammalogist, after whom *Pseudoryzomys wavrini reigi* was named.

Remsen, James Vanderbeek, Jr., b. 1949: LSUMZ ornithologist; in 1979, 1980, 1981, 1984, and 1986, localities in Cochabamba, La Paz, and Santa Cruz.

Remsik, Patricia A.: with R. H. Pine, S. Anderson, and R. J. Anderson in July, August, and September 1980 (field numbers 1–141).

Riddle, Brett R.: graduate student at UNM; with AMNH-MSB party in 1985 (field numbers 2007–2309).

Rios U., Boris: student CBF; with 1993 MSB party (field numbers 4–46).

Robert, Alphonse: collector for British Museum in Matto Grosso, after whom *Aotus roberti*, and *Rhipidomys roberti* (= *Oecomys roberti*) were named.

Rocha, N.: with MNK party near San Ramón in September 1991.

Rocha Olivio, Omar: CBF; September 1987 at Irupana; at EBB in December 1988; collected owl pellets with E. Peñaranda in 1993.

Rocha Olivio, Sandra: student in La Paz; with AMNH-MSB party in July 1991 (field numbers 3–21); sister of Omar.

Rojas, José Manuel: student in Santa Cruz; with 1993 MSB party (field numbers 1–13).

Rosales, H.: student with MNK party at Basilio in 1991–1992.

Ruedas, Luis A.: student in New York and Texas; with AMNH-MSB parties in 1985 (field numbers 239–309) and 1986 (field numbers 326–516).

Rusby, Henry Hurd, 1855–1940: botanist in New York; in 1885 in Bolivia; see Allen (1889) and Rusby (1933); after whom *Artibeus rusbyi* was named.

Saavedra, A. M.: student with MNK party at Basilio in 1991–1992.

Sainz Bacherer, Lila Alejandra: student in genetics, MNK; with AMNH-MSB party in July and August 1991 (mammal field numbers 16–60); May 1992 at Pailón.

Salazar Bravo, Jorge A.: student in La Paz, later graduate student at UNM; with Riddle and Operation Raleigh at Amboró in 1985; January 1986 at Espíritu; with AMNH-MSB party in September and October 1986 (field numbers 26–68); with MSB party in July and August 1987; with Wilson in 1986; in Beni and La Paz for MNLP in 1988, 1989, and 1990; with Cook party in 1988 (field numbers 221—258); with AMNH-MSB party in June and July 1990 (field numbers 373–405); with AMNH-MSB party from May to August 1991 (field numbers 416–506); with AMNH-MSB party from June to

August 1992 (field numbers 530–548); with 1993 MSB party (field numbers 607–641).

Salinas de Mesa, Elvira: at EBB, October 1992.

Salvin, Osbert: collected in Central America; with Godman edited "Biología Centrali-Americana"; after whom *Chiroderma salvini* was named.

Sanborn, Colin Campbell, 1897–1962: curator at FMNH; at Silala, Potosí, 14,160 ft (= 4350 m), in April 1924; after whom *Sciurus sanborni* was named.

Sanchez, Lupita: with MNK party, November 1992.

Santalla Zuazo, Claudia Milencka: student in La Paz; with AMNH-MSB party in July and August 1992 (field numbers 1–51).

Santivañez Golorza, José Luis: October 1990 at Tipoy; November 1990 to August 1991 near San Ramón; August 1991; February 1992 at La Belgica; May 1992 at Terebinto; July 1992 at Cotoca; September 1992 at El Cedrito; with PRBN parties in 1992.

Sarmiento, Jaime: ichthyologist with MNLP, director of CBF; collected mammals with Yoneda, July and August 1986.

Scherrer, R.: on río Beni in April 1925 for MACN.

Schmidt, Karl and Frank J. W.: collectors, after whom *Micronycteris schmidtorum* was named.

Schmitt, Carl Gregory: Sante Fe, New Mexico; collected with D. C. Cole in 1978, 1979, and 1984 for AMNH.

Schnable, [given names unknown]: after whom *Amorphochilus schnablii* was named "at request of Mr. Taczanowski" (Peters, 1877).

Schuster, Karl J.: with AMNH-MSB party in September and October 1986 (field numbers 85–109).

Seaton, Carston Thomas: undergraduate student at UAF; with 1993 MSB party (field numbers 90–174).

Serrano, Pilar: Spanish ornithologist; collected owl pellets in 1984 (Serrano and Anderson, 1986); with EBD parties between 1981 and 1986; also collected some mammals.

Servicio Geologico de Bolivia (GEOBOL).

Servicio Nacional de Control de Fiebre Hemorrágica Boliviana (SNCFHB): collected at Magdalena and La Cayoba in 1985; specimens in Departamento de Ciencias Naturales, Universidad Nacional de Río Cuarto, Córdoba, Argentina (Torres et al., 1988).

Shipton, Mr. S.: ornithological collector, after whom *Microcavia shiptoni* was named.

Silva, Oswaldo V.: 1938, two *Philander opossum* in AMNH from Santa Cruz received from the Rockefeller Foundation; 1948, specimens in Rio de Janeiro.

Simoni, C.: IE party, March 1979, 1980, in La Paz.

Simons, Perry O.: collected for the BM in 1900 and in 1901 in Cochabamba, Potosí, Oruro, Chuquisaca, and La Paz (Thomas, 1902a, 1902b, 1902c; Chubb, 1919); in 1903 in Cochabamba; after whom *Neoctodon simonsi* (= *Octodontomys gliroides*), *Proechimys simonsi*, and *Coendou simonsi* were named.

Smith, Kent Sanders: Peace Corp volunteer; CBF; , with AMNH-MSB party in August 1991 (field numbers 1–20); with RAP team in Pando in 1992; May and June 1992 with TIPNIS party on río Sécure; July 1992 at La Reserva; río Cotarajes in August 1992; Aceramarca in September 1992; Solocama in October 1992; Sajama in 1992; Santa Cruz in March 1993.

Solomon, James C.: Missouri Botanical Garden; worked 4 years in Bolivia; obtained a deer skull for MNHN in 1987.

Specht, Rudolph: got specimen of *Eumops perotis* in 1990.

Spegazzini, Carlos, 1858–1926: "well-known fungologist of La Plata" (Thomas, 1897a: 214), after whom *Akodon spegazzinii* and *Tapirus spegazzinii* were named.

Spix, Johann Baptiste von, 1781–1826: German naturalist and explorer in the Amazon region, after whom *Cavia spixii* (= *Galea spixii*) was named.

Spurrell, H. G. F.: after whom *Lionycteris spurrelli* was named.

Stager, Kenneth E.: collected with Bromley in 1957 for LACM.

Stearman, Allyn MacLean: anthropologist; studied use of wildlife by Yuquis on río Chimoré in Cochabamba at various times from 1982 to 1991 (Stearman, 1990, 1994).

Steer, J. B.: naturalist and traveler, after whom *Proechimys steerei* was named.

Steinbach, E.: collected fleas at Santa Cruz de la Sierra in 1906 (Hopkins and Rothschild, 1953: 154). I don't know the relationship of E. Steinbach to the other Steinbachs.

Steinbach, Francisco B., also known as Franz, b. 1908: son of José Steinbach; many localities in Cochabamba, La Paz, and Santa Cruz at various times from 1926 through 1953.

Steinbach, José: German naturalist who moved to Bolivia and lived in Buenavista, Santa Cruz; many localities in Cochabamba, Santa Cruz, and Tarija at various times from 1910 through 1938; specimens from Buena Vista are in many museums; after whom *Ctenomys steinbachi*, *Leopardus pardalis steinbachi*, and *Sciurus langsdorffi steinbachi* were named.

Steinbach, Roy: son of F. B. Steinbach; specimens from Santiago in Santa Cruz from 1973.

Stolzmann, Jean: "well-known Polish collector" (Thomas, 1882: 98); director of the Branicki Museum, Warsaw (Thomas, 1893b: 333); after whom *Oligoryzomys stolzmanni* was named.

Straney, Donald O.: MSU, several localities in Beni and Santa Cruz in 1979.

Suárez, Herson: with Townsend in 1991.

Suárez Vargas, Armando: at EBB, date unknown.

Subieta Frías, Monica Marianela: student in La Paz; with AMNH-MSB party in July 1992 (field numbers 1–12).

Szwagrzak, Andrés: ornithologist, executive secretary of Asociatión Boliviana Pro Defensa de la Naturaleza (PRODENA); collected owl pellets in 1988 and later.

Taczanowski, Ladislas, 1819–1890: ornithologist in Peru; director of Warsaw museum; after whom *Thomasomys taczanowskii* and *Coelogenys taczanowskii* (= *Agouti taczanowskii*) were named.

Talbot, William A.: physician from Albuquerque, with AMNH-MSB party in July—August 1986 (field numbers 50–81).

Tapia Arauz, María Cristina: student UAGRM; March 1989 at Amboró; January 1990 at Sehuencas; March 1990 at Campamento II; September 1990 at Wandá Patriota; with AMNH-MSB parties in July and August 1990 (field numbers 124–160) and in July and August 1991 (field numbers 175–213); with MNK parties near San Ramón, January to September 1991; with MNK party at Pailón in 1991–1992; with PRBN party, June to October 1992.

Tardio, Dr. Jorge Arduz: collected at five localities in Chuquisaca in 1952.

Tarifa Suárez, Teresa: student UMSA; with AMNH-MSB parties in October 1986 and in July 1990 (field numbers 1–17); CBF parties, May 1991 at Ulla Ulla, July 1992 at Huaraco, September 1992 at Aceramarca, October 1992 at Irupana, and November and December 1992 in Sajama region.

Tate, George H. H., 1894–1953: AMNH; collected in department of La Paz in 1926; fieldnotes at AMNH; catalog numbers 72550–72850, 72851–73099, 73700, 74153–74154; itinerary summarized by Boom (1981).

Tejada Salgueiro, Renata: CBF, with AMNH-MSB party in July 1992 (field numbers 1–16).

Tello, José Lobao: European naturalist; in 1985 and 1986 collected in Pando, Beni, and Santa Cruz; specimens were the initial nucleus for the new collection at MNK (field numbers 1–285).

Temminck, Coenraad Jacob, 1778–1858: first director of the Rijksmuseum van Naturlijke Historie in Leiden; after whom *Dysopes temminckii* (= *Molossops temminckii*) was named.

Terceros C., Luis Fernando: student UAGRM; with AMNH-MSB party in June and July 1990 (field numbers 1–11).

Territorio Indígena Parque Nacional Isiboro-Sécure (TIPNIS)

Texas Tech University (TTU), Lubbock.

Thomas, Michael Rogers Oldfield, 1858–1929: BMNH after whom *Thomasomys*, *Eptesicus brasiliensis thomasi*, *Uroderma bilobatum thomasi*, and *Lonchophylla thomasi* were named.

Tiurina, Tatiana: Russian student in La Paz; with AMNH-MSB party in July and August 1992 (field numbers 1–62).

Townsend, Wendy: ethnozoologist, University of Florida, collected in Beni in 1991; specimens at CBF and MNK.

Trusta, Jorge: collected with Prince in 1965.

Tschudi, Johann Jakob von, 1818–1889: collector in Peru in 1838, after whom *Cavia tschudii* was named.

Tyson, Edward: graduate student at University of Florida; studied bats in San Joaquín hemorrhagic fever study; with MARU party.

United Nations Educational, Scientific, and Cultural Organization (UNESCO).

United States National Museum (USNM): Washington, D.C.; now the National Museum of Natural History.

Universidad Autonoma "Gabriel René Moreno" (UAGRM): Santa Cruz.

Universidad Mayor de San Andrés (UMSA): La Paz.

University of Alaska, Fairbanks (UAF).

University of California at Davis (UCD).

University of Connecticut (UCONN): Storrs.

University of Michigan Museum of Zoology (UMMZ): Ann Arbor.

University of New Mexico (UNM): Albuquerque.

Urdiales, Carlos: August and September 1988, with J. Cabot in Santa Cruz, Cochabamba, and Oruro.

Urios, Vicente: with EBD party in 1986.

Urioste Vidaurre, Roberto José de: student in La Paz; with AMNH-MSB party in August 1991 (field numbers 4–44); with CBF party in October 1991 in Pando.

Vaca, Eneida: student UAGRM; with Cook party in 1988 (field numbers 1–22).

Vaca Salvatierra, Darwin: collected in 1987, student UAGRM; with AMNH party in November 1987; with Cook party in 1988 (field numbers 1–30); with MSB party in 1991; MNK, with AMNH-MSB party in July and August 1992 (field numbers 75—100).

Van Gelder, Richard George, 1928–1994: curator at AMNH, New York; 19 April to 11 June 1965, field numbers 1552–1755; organized expeditions to Beni in 1964 and 1965 with support from grant no. DA-MD-49-193-63-G82, U.S. Army Medical Research and Development Command.

Varela, Ivan: with EBD party in 1986.

Várgas, Edgar: *Felis concolor*, September 1990.

Várgas Mattos, Rosa Julieta: student of parasitology, CBF; with AMNH-MSB party in August 1991 (field numbers 1–3); with CBF party in August 1991 at Inquisivi and Huaraco; CBF parties, August 1991 at Cocapata, October 1991 in Pando, December 1991 in Sud Yungas, April 1992 in province of Aroma in La Paz, May 1992 in TIPNIS, July 1992 at Huaraco, September 1992 at La Reserva, October 1992 in Pando; with TIPNIS party in 1992.

Vellard, Juan: at Lago Titicaca, date unknown, one specimen in MACN.

Villalba, Lílian: August 1981 at Huaraco; March 1990 at Ulla Ulla; studied camelids.

Vinas, M.: collected in Tarija for MACN.

Wagner, brothers (given names not noted by Rusconi): collectors of fossils in Santiago del Estero, Argentina; after whom *Platygonus* (*Parachoerus*) *carlesi wagneri* (= *Catagonus wagneri*) was named.

Walcott, Frederic Collin, 1869–1949: specimen in 1924.

Wallace, Rob: with PRBN parties in 1992.

Wavrin, Robert Marquis de, 1888–19??: after whom *Pseudoryzomys wavrini* was named.

Webster, William David: MSU; several localities in La Paz in 1979 (Webster and Jones, 1980).

Weddell, Hugues Algernon: member of the Castelnau Expedition, after whom *Midas weddellii* (= *Saguinus fuscicollis weddellii*) was named (Weddell, 1853).

Werneck, Fabio Leoni: Brazilian entomologist, Instituto Oswaldo Cruz.

Wied-Neuwied, Maximilian Alexander Philipp Prinz von, 1782–1867: after whom *Felis wiedii* was named.

Wike, Melanie Joy: student at UAF, with AMNH-MSB party in July and August 1992 (field numbers 16–63).

Wilson, Don Ellis, b. 1942: U.S. Fish and Wildlife Service; visited the EBB in 1986 (field numbers 7185–7266).

Wolffsohn, J. A.: collected in Chile; after whom *Phyllotis wolffsohni* and *Lagidium wolffsohni* were named.

Wood, Rosemary: of the Bolivian Wildlife Society (UK); with AMNH-MSB party in June 1990.

Ximénez, Alfredo: Museo Nacional de Historia Natural, Montevideo; with AMNH expedition from 11 April to 13 October 1964 (field numbers 2027–2602) and 1 May to 13 August 1965 (field numbers 2706–3027).

Yates, Terry L., b. 1950: University of New Mexico; member of AMNH-MSB parties, August to September 1984 (field numbers 1155–1210), July and August 1985 (field numbers 1222–1231), July and August 1986 (field numbers 1234–1255), June and July 1990 (field numbers 1345–1370), and June and July 1991 (field numbers 1500–1505); with 1993 MSB party (field numbers 1514–1541).

Yensen, A. Eric: Albertson College, Caldwell, Idaho; various localities in La Paz and Oruro, September to December 1992.

Yepes, José: one specimen obtained in 1936; in La Paz in 1941 with Crespo.

Yoneda, Masaaki: Japanese mammalogist who worked with the Kyoto University Expedition in 1979 in Pando and helped organize the collections and exhibits of the new MNLP; 1981–1983 and 1990.

Young, C. G.: of British Guiana, now Guyana; after whom *Desmodus youngi* was named.

Yubanure Yumo, Inocencio: with a CBF party in May and June 1992.

Zalles, Luis Marcelo: professor UAGRM; with an AMNH-MSB party in June and July 1990 (field numbers 40–75); MNK in 1990 and 1991 near San Ramón; studied at UNM in 1993 and 1994; studied *Hydrochaeris* in 1993.

Zischka, Rudolph: 1954 and 1960–1962, specimens for museum in Munich.

Zoologische Staatssammlung München (ZSM).

Zoologische Museum, Museum für Naturkunde der Humboldt Universitet zu Berlin (ZMB).

SYSTEMATIC ACCOUNTS

Within each species or subspecies account, the organization is as follows:

The scientific name, author, and date are cited. Then, one or more vernacular names may be given; however, I have not provided or invented names if none is in common use. Teresa Tarifa S. of La Paz has been compiling a list of common names in different languages used in Bolivia. Its publication would be useful. The basic purpose of having and using scientific names is to facilitate communication and to link information from different sources. Synonymies serve the same purpose.

Taxonomic remarks include references to any extralimital sources of names that have been used for Bolivian specimens. Comments on classification, changing taxonomic knowledge, and nomenclature may be given also.

Morphological characters and comparisons are given, but no attempt to provide complete technical diagnoses is implied. The selected notes are intended as an adjunct to characters in the keys and tables of measurements and include references to the appropriate tables of measurements. If chromosomal data on Bolivian specimens have been published, a summary and citation are provided under the heading of karyology. *Distributional notes* refer to the map showing distribution within Bolivia. If available, Bolivian data (as noted earlier, no attempt is made to summarize information from outside Bolivia) on habitat, parasites, habits, behavior, food, or reproduction are summarized under the appropriate headings.

Reproduction: On about 10,000 cards, I recorded data from specimen labels or fieldnotes when these sources were examined. In many cases no data were recorded. From these cards, notes on reproduction were compiled with no special effort to expand this set of data. For example, I did not dissect specimens in alcohol to learn reproductive state. The limitations of this sampling are evident if you compare the total numbers of specimens reported with the number for which reproductive data are summarized. Generally, the latter is a very small percentage of the total. In some samples, many of the specimens cited are fragments from owl pellets or are skulls picked up where discarded at some village. Whether these skulls or fragments are from males or females is generally unknown (unless the species exhibits pronounced secondary sexual dimorphism).

Synonymies: Because there are no standard criteria for presenting synonymies of scientific names, synonymies are not equivalent in different publications. It is therefore important for the reader to understand the author's intent. My purpose is to document all names used for Bolivian specimens. Some other names that are directly relevant are included under Taxonomic Remarks. The basic purpose of each synonymy is to link information that has been published under different names and that is now thought to refer to the same taxon. A second purpose is to document the history of changing nomenclature and taxonomy for each taxon within Bolivia. Thus, a nearly complete bibliography of publications containing primary data (as contrasted to secondary sources such as encyclopedia articles) for the country is provided. Many citations provide little or no primary data but do serve the historical purpose. Variant spellings are included if they were used explicitly for Bolivian specimens or in Bolivian lists. Some variants were used deliberately and others were accidental.

It is important to emphasize that among the synonyms are misidentifications. In these cases, the reader should not assume that the scientific name is a synonym in any other sense than that it was used by the specific author, cited in a specific work on a specific page, for specimens that I regard as belonging to the taxon under consideration. The misused name may or may not have completely valid usage for other specimens or in other countries. I emphasize this point because most of those who reviewed the manuscript misinterpreted synonymies in one way or another because they had not read or did not remember this explanation.

Localities and Specimens: Firstly, this list is arranged alphabetically by departments. Within each department, localities are arranged numerically by latitude and longitude. These are given in an abridged form (see the

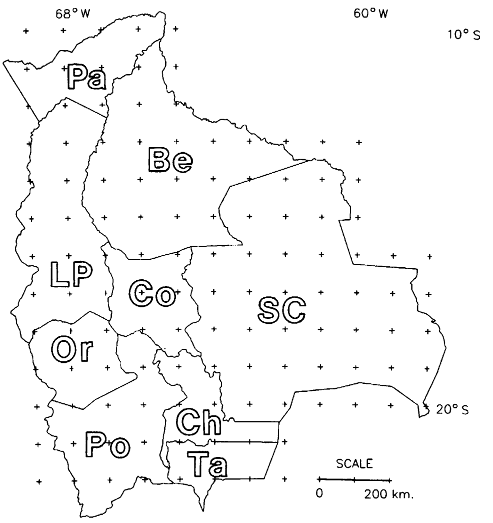


Fig. 482. Map of Bolivia with the departments labeled. Be = Beni, Co = Cochabamba, Ch = Chuquisaca, LP = La Paz, Or = Oruro, Pa = Pando, Po = Potosí, SC = Santa Cruz, and Ta = Tarija.

gazetteer of localities for explanation). Each locality also is given by name and includes the numbers of specimens from there and the collections housing them. Acronyms for the collections are given elsewhere. Departments are shown in fig. 482.

The following accounts are of taxa that are represented by Bolivian specimens. Accounts of species that may be postulated to occur in Bolivia but that are not yet represented by specimens are in a subsequent list.

ORDER MARSUPIALIA ILLIGER, 1811

TAXONOMIC REMARKS: The Marsupialia have been divided into several orders by some recent authors (e.g., by Gardner and by Groves; see Wilson and Reeder, 1993: 13–62). The paleontological record documents extinct families of marsupials that lived in South America and in Bolivia (Marshall, 1982), including representatives of the Microbiotheria. Some species were larger than dogs, but these became extinct long before humans came to South America (Marshall, 1978a).

Living marsupials occur in the Americas and in Australia where they are most diverse. The order is named for the marsupium or abdominal pouch of skin that occurs in some, but not all, genera. The pouch is present in the Bolivian genera *Didelphis*, *Philander*, and *Chironectes*; its development varies with species from essentially complete to absent in other genera.

The measurements of marsupials included in tables 2 and 3 are total length, length of tail, length of hind foot, length of ear, and weight, which are from collectors' field measurements unless noted otherwise. The length of the foot is given both with claws and without claws when measurements are available. The length of ear is from the basal notch to margin at tip. Cranial measurements are condylobasal and palatal lengths, and breadths across upper dentition (dental span), across lambdoidal crests, at interorbital and postorbital constriction, and at tips of the intervening supraorbital bulges or processes.

FAMILY DIDELPHIDAE GRAY, 1821

TAXONOMIC REMARKS: Hershkovitz (1992a) treated the group as an order, the Didelphoidia, with families Marmosidae, Caluromyidae, Glironiidae, and Didelphidae. Gardner (*in* Wilson and Reeder, 1993) recognized an order Didelphimorpha, including the Didelphidae, with subfamilies Caluromyinae and Didelphinae, the arrangement followed here.

Didelphid marsupials range from the size of a small mouse to that of a house cat. They have five toes on each foot and the first toe of the hind foot is opposable to the others and lacks a claw. They have five pairs of small upper incisors. The snout is rather prominent and pointed. The tail is more or less prehensile in most species and is usually naked for at least the distal part of its length. Didelphids have only three premolars above and below. The third is somewhat molariform and is replaced by a premolariform tooth. Only the third is deciduous.

CONSERVATION STATUS: No didelphid is listed as endangered or threatened under CITES.

SUBFAMILY CALUROMYINAE KIRSCH, 1977

Genus *Caluromys* Allen, 1900

TAXONOMIC REMARKS: Only one of the three species of *Caluromys* is known to inhabit Bolivia. Treated as a subfamily, Caluromyinae, of family Caluromyidae, by Hershkovitz (1992a: 189).

Morphological Characters and Comparisons: These woolly opossums are quite arboreal and have dense, soft, pale brown fur. A dark stripe may extend down the rostrum from the forehead and sometimes there are gray patches in the brown fur.

Caluromys lanatus
(Olfers *in* Eschwege), 1818
Woolly Opossum

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *D[idelphys] lanata* was described by Olfers *in* Eschwege (1818: 206), type locality restricted to Caazapa, Paraguay, by Cabrera (1958: 3); *lanata* of Illiger, 1815, was regarded as a *nomen nudum* by Hershkovitz (1959a: 345). Cabrera (1958: 2) first used the name combination *Caluromys lanatus lanatus*. The subspecies *Caluromys lanatus ornatus* (Tschudi, 1845: 146, pl. 7) is known from Peru and might occur in Bolivia. Geographic variation in the species needs to be studied.

Morphological Characters and Comparisons: Pale brown fur extends along the dorsal surface of the tail for nearly half of its great length. Specimens measured for tables 2 and 3 are from San Joaquín (FM 114649), Buenavista (BM 28.2.9.79, FM 51885, FM 25265), and Santa Cruz de la Sierra (AM 133205).

Distributional Notes: Known Bolivian localities are listed below and mapped in figure 483.

Habitat: All known localities are at low elevations (less than 500 m).

No Bolivian data are available on habits, behavior, or food.

Reproduction: A specimen from Isla Gargantua had four "pouch" young when taken on 31 July. No other reproductive data are available for Bolivia.

Scientific synonyms used for Bolivian specimens are:

Caluromys lanatus lanatus
(Olfers *in* Eschwege, 1818)

Phylander laniger: Arce Pereira et al., 1963: 152 (name in list; Palmar, Todos Santos; no specimen, perhaps referred to this species).

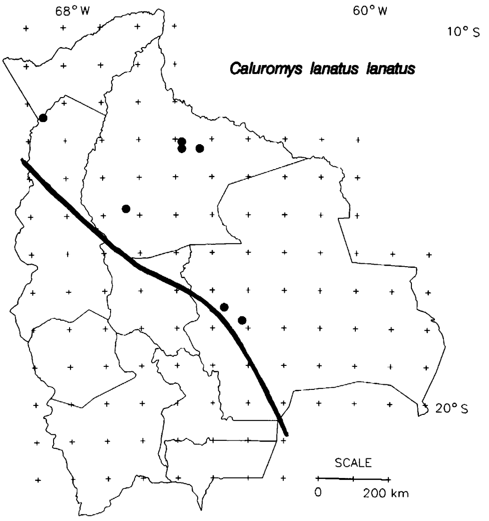


Fig. 483. Localities of known occurrence of *Caluromys lanatus lanatus*, dots. Estimated limit of range shown by line.

Caluromys lanatus lanatus: Crespo, 1974: 3 (one specimen from Buenavista). Anderson, 1985b: 5 (name in list). Anderson et al., 1993: 16 (vicinity of Santa Cruz de la Sierra).

Caluromys lanatus: Cabot et al., 1986: 42 (name in list). Emmons and Feer, 1990: 12 (mentioned Bolivia). Emmons, 1991: 72 (seen at Alto Río Madidi in La Paz department). Anderson, 1993: 18 (general distributional records).

Localities (7) and Specimens (20): **Beni:** 1304/6449, San Joaquín, 2 FM; 1315/6420, Piedras Blancas, 1 MNK; 1315/6448, Yutiole, estancia 20 km S of San Joaquín, 1 AM; 1450/6622, Los Tajibos, 40 km E of San Borja, 1 EBD. **Pando:** 1223/6835, Isla Gargantua, 1 MSB. **Santa Cruz:** 1727/6340, Buenavista, 6 BM, 2 FM, 4 MACN (1 was reported by Crespo, 1974; 1 not examined); 1748/6310, Santa Cruz de la Sierra, 1 AM, 1 CM.

Genus *Glironia* Thomas, 1912

Taxonomic Remarks: The genus contains only one species (Marshall, 1978c). The family Glironiidae was recognized by Hershkovitz (1992a).

Glironia venusta Thomas, 1912
Bushy-tailed Opossum

Taxonomic Remarks: The name used for Bolivian specimens has its type locality out-

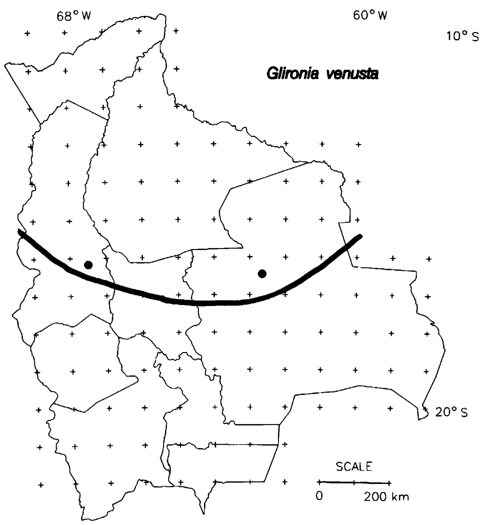


Fig. 484. Localities of known occurrence of *Glironia venusta.*

side of Bolivia. *Glironia venusta* was described by Thomas (1912a: 240), type locality "Pozuzo, Peru. Alt. 800 m." in the department of Huanuco.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: *Glironia venusta* is a medium-sized didelphid; the fur is wooly and dorsally fawn in color, and the face is marked with a medial grayish white stripe and large black patches on either side. The tail is long and densely furred with long hairs nearly to its tip, which is white. Measurements are in tables 2 and 3 (Marshall, 1978c).

DISTRIBUTIONAL NOTES: Known from only two Bolivian localities and one of these is not exact; see list below and map (fig. 484).

HABITAT: One locality is on the forested east slopes of the Andes (the yungas) and one at the edge of the Chaco (or Chiquitania).

No Bolivian data are available on habits, behavior, food, or reproduction.

Only one scientific name has been used for Bolivian specimens of this species.

Glironia venusta: Thomas, 1912c: 47 (yungas of Bolivia). Cabrera, 1958: 5. Marshall, 1978c: 2. Anderson, 1985b: 5 (name in list). Emmons and Feer, 1990: 14 (mentioned Bolivia). Emmons, 1991: 72 (seen at río Machariopo in La Paz department). Anderson, 1993: 18 (general distributional records).

LOCALITIES (2) AND SPECIMENS (2): **La Paz:** 1610/6730, "Yungas," 1 BM. **Santa Cruz:** 1627/6239, 12 km S of San Javier, 1 CBF.

The specimen at the British Museum (12.4.9.1) was formerly Hamburg Museum no. 28296, young male in alcohol, obtained through Dr. K. Kraepelin. Coordinates have been given arbitrarily as in the Yungas of La Paz department.

SUBFAMILY DIDELPHINAE GRAY, 1821

Genus *Chironectes* Illiger, 1811

Chironectes minimus minimus (Zimmermann), 1780

Water Opossum and Yapok

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Lutra minima* was described by Zimmermann (1780: 317), type locality Cayenne, French Guiana. Cabrera (1958a: 43) first used the current name combination *Chironectes minimus minimus.*

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Have close, soft, water-repelling fur with an unusual pattern of broad black transverse bands on a gray background. Webs between the toes on pes fit them for their aquatic mode of life. The pouch is complete. Measurements in tables 2 and 3 are from Marshall (1978d), Brazil (AM 96760), or La Reserva (AM 264572, CBF 2294, MSB 68329, 68330).

DISTRIBUTIONAL NOTES: See list below and map in figure 485. In August 1987, three biologists with the 1987 Durham University Expedition to Bolivia observed a water opossum at elevation 500 m on the río Pitasama, at 500 m, in the Parque Nacional de Amboró, department of Santa Cruz. The approximate coordinates at this point are 1742/6337. Observations were at close range and for several minutes. This first-hand and detailed report provided the first reliable and documented record of the species for Bolivia, albeit without a voucher specimen. A second animal was observed at "15°30′S, 71°10′W," in the department of Beni (Cabot, 1989). The coordinates of this locality, Campamento 6 de Agosto, were corrected to 15°17′S, 67°05′W by Salazar Bravo et al. (1994: 126). The first

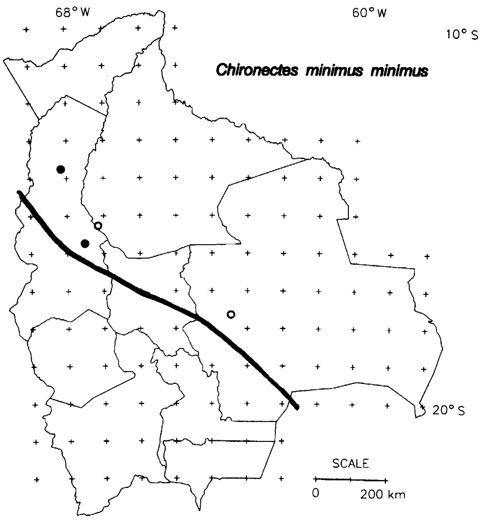


Fig. 485. Dots are localities represented by specimens of *Chironectes minimus minimus*. Circles represent the localities of reported observations noted in text.

specimens were obtained in 1992 at La Reserva. The species probably occurs throughout the Yungas zone in suitable habitats.

HABITAT: All Bolivian observations have been of animals in or near streams.

HABITS AND BEHAVIOR: They swim and seek food in streams.

No Bolivian data on food or reproduction are available.

Scientific synonyms relevant to Bolivian specimens are:

Chironectes minimus minimus: Anderson, 1993: 20 (two localities in La Paz). Anderson et al., 1993: 19 (vicinity of Santa Cruz de la Sierra).

Chironectes minimus: Suárez Morales, 1986: 39 (undocumented name in list): Strachan *in* Dunstone, 1988: 47, sight record. Cabot, 1989: 135 (sight record). Yensen et al., 1994: 406 (1445/6830). Salazar Bravo et al., 1994: 126 (first Bolivian specimens).

LOCALITIES (2) AND SPECIMENS (8): **La Paz:** 1443/6830, Apolo, 1 CBF; 1544/6731, La Reserva, 840m, 3 AM, 1 CBF, 3 MSB.

Genus *Didelphis* Linnaeus, 1758

The largest of the living Bolivian marsupials belong to this genus. Adults of these two species are about the size of a house cat and have pelage with a mixture of fine hairs and long, coarse guard hairs. The snout is relatively long and pointed; the vibrissae are prominent. The ears are large and naked, white or mostly white in one species and black or mostly black in the other. The tail is naked, prehensile, conspicuously scaled, and somewhat variable in length. The pouch of the female may contain as many as 13 nipples; usually fewer young and fewer enlarged or functional nipples are found.

TAXONOMIC REMARKS: Burmeister (1869: 455) reported a skin and skull from Santa Cruz de la Sierra under the name *Didelphys cancrivora*. I did not see these at MACN, and am not sure of their identity.

Didelphis albiventris Lund, 1842

TAXONOMIC REMARKS: The name of the species used for Bolivian specimens has its type locality outside of Bolivia; *Didelphis albiventris* was described by Lund (1842: 236), type locality Lagoa Santa, Minas Geraes, Brazil. Hershkovitz (1972: 403) discussed the use of Lund's name and included a distribution map, but referred to no specific Bolivian record. Two subspecies of *D. albiventris* were recognized by Cerqueira (1985: 139). The nominate subspecies, *D. a. albiventris*, was said to occur, among other places, in the Chaco and the Monte Desert of Argentina as well as the cerrados and caatinga of Brazil. One locality was mapped in the lowlands of eastern Bolivia. Inasmuch as neither a specific list of specimens nor one of localities was given (nor do I know of a specimen from near the place mapped), the basis for mapping this locality is unclear, although *Didelphis* no doubt occurs there. One other locality was mapped in the Yungas of western Bolivia.

The subspecies *D. a. azarae* Tschudi, 1844, was said to occupy the "Equatorial Andes, Puna, Paramo." However, there are two problems with this. Tschudi, who used the name in reference to Peruvian specimens, was not the original author of the name *azarae*. Temminck (1824 *in* 1824–1841: 30) was the original author, and the type locality is Asunción, Paraguay, which lies within the range assigned by Cerqueira (1985) to *D. a. albiventris*. Furthermore, Hershkovitz (1972: 403) wrote that the name *azarae* was based on several black-eared opossums. If the name *azarae* did apply to a white-eared opossum, it would be a synonym of *albiventris* as used by Cerqueira (1985) and the correct name for the Andean subspecies is *D. a. pernigra*. If *azarae* applies to a black-eared opossum, it is a synonym of *D. marsupialis*, or if the population in southeastern Brazil does eventually prove to be a separate species, its correct name may then be *D. azarae*, an older name than *D. aurita*. To further complicate the situation, Gardner (*in* Wilson and Reeder, 1993: 16) regarded *Didelphis aurita* as a distinct species, with *azarae* Temminck, 1824, as conspecific. *Didelphis pernigra* was described by Allen (1900c: 191), type locality "Juliaca, Peru, altitude 7000 feet" or according to Cabrera (1958: 42), Inca Mines, Cuzco, Peru. The name *Didelphis paraguayensis* was cited by Allen (1902: 251) from Oken (1816: 1147) but Oken's paper was not consistently binomial and is not available as a source of names under the Code. The type locality is Paraguay.

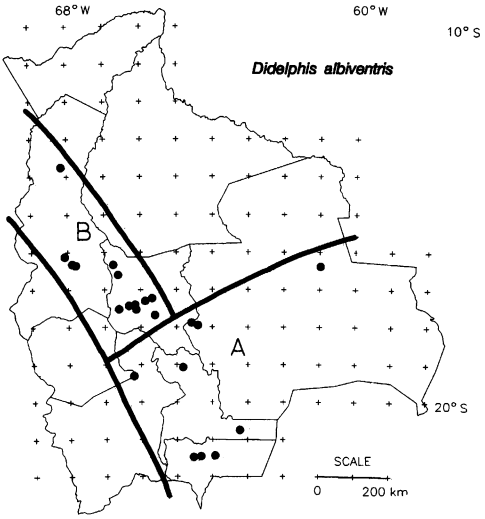


Fig. 486. Localities of known occurrence of *Didelphis albiventris* and its subspecies in Bolivia. *D. a. albiventris* (A) and *D. a. pernigra* (B). The record in eastern Santa Cruz is based on one specimen in alcohol that I examined several years ago. Additional specimens of *Didelphis* are needed from Santa Cruz.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: The white-eared opossum with patterns of contrasting black and white on the head contrasts with the overall grayish black-eared opossum.

DISTRIBUTIONAL NOTES: See list below and map (fig. 486). The white-eared opossum, *Didelphis albiventris*, generally occurs at higher elevations in Bolivia than the black-eared opossum, *Didelphis marsupialis*. They both are known from Pitiguaya at elevation 1785 m, however.

No Bolivian data on habits, behavior, or food are available.

REPRODUCTION: One female taken in August had five young in the pouch. Two females captured in June had no embryos or pouch young. No other data are available.

Didelphis albiventris albiventris Lund, 1841

White-eared Opossum

Scientific synonyms used for Bolivian specimens are:

Didelphis albiventris: Emmons and Feer, 1990: 16 (mentioned Bolivia). Ergueta and Salazar Bravo, 1991: 12 (general summary). Gardner *in* Wilson and Reeder, 1993: 16 (notes on taxonomy and nomenclature). Parker et al., 1993: 102 (reported by local people at Curuyuqui and Perforaci6n).

Didelphis marsupialis, var. *azarae*: Thomas, 1888b: 329 (three collected by Bridges).

Didelphis paraguayensis: Allen, 1902: 268 (eastern Bolivia). Thomas, 1926a: 327 (Carlazo).

Didelphis albiventris albiventris: Anderson, 1985b: 6 (name in list). Cerqueira, 1985: 139 (mentioned Beni, although I know of no specimen from that department). Anderson, 1993: 20 (general distributional records).

LOCALITIES (10) AND SPECIMENS (22): **Chuquisaca:** 1904/6449, 12 km N and 11 km E of Tarabuco, 2450 m, 1 AM, 1 MNK, 1 MNLP, 1 MSB; 2045/6313, Porvenir, 1 MSB; 2045/6313, 1.3 km SW of Porvenir, 1 AM. **Potosí:** 1918/6612, río Cachimayo, 2 AM. **Santa Cruz:** 1623/6059, San Ignacio de Velasco, 1 US, 1 Oklahoma State University Museum; 1753/6435, 15 km by road W of Comarapa, 1 AM; 1757/6424, 6 km S and 10 km E of Comarapa, 1 AM. **Tarija:** 2126/6355, Tapecua, 1 AM, 1 CBF, 1 MSB; 2127/6419, Rancho Tambo, 61 km by road E of Tarija, 1 AM, 1 MSB; 2128/6432, Carlazo, 2 BM. **Department unknown:** "Bolivia," 3 BM (Thomas, 1888b).

Measurements in tables 2 and 3 are of specimens from the río Cachimayo (AM 39005, 39006) and 15 km W of Comarapa (AM 260040).

Didelphis albiventris pernigra Allen, 1900

Didelphis Azarae: Gray and Gray, 1847: 30 (one young from "Bolivia" in Bridges' collection, identification uncertain, see discussion above. Thomas, 1902a: 143 (Charuplaya, Tapacari). Neveu-Lemaire and Grandidier, 1911: 19 (same records).

Didelphis paraguayensis pernigra: Allen, 1902: 271 (La Paz department).

Didelphis albiventris pernigra: Anderson, 1985b: 6 (name in list). Anderson, 1993: 19 (general distributional records).

Localities (15) and Specimens (40)+: **Cochabamba:** 1636/6637, Charuplaya, 1 BM; 1620/6645, Yungas, 1 CM; 1714/6541, Incachaca, 3 AM, 4 ANSP, 1 BM, 2 CM; 1718/6552, 5 km N Colomi, 1 AM; 1724/6609, Cochabamba, 1 BM, 1 CM, 1 MACN (not examined); 1726/6619, Vinto, 5 AM; 1731/6636, Tapacari, 1 BM; 1732/6607, 1.3 km W of Jamachuma, 1 CBF, 1 MSB; 1741/6536, 7.5 km SE of Rodeo, 1 AM. **La Paz:** 1345/6809, Ixiamas, 1 CBF; 1607/6805, 0.5 km E of Saynani, 1 CBF, 1 MSB; 1619/6752, Ñequejahuira, 1 AM; 1619/6753, río Aceromarca, 1 CBF, 5 MSB; 1621/6747, Pitiguaya, 1 AM; coordinates unknown, Zongo Valley, "Centro Hidroelectrica," 1 CBF. **Department unknown:** coordinates unknown, perhaps from Bolivia, 1 AM, 2 BM.

Measurements in tables 2 and 3 are of specimens from Incachaca (3 males, AM 38779, 38780, BM 34.9.2.189), Vinto (AM 38777, 38778), and Ñequejahuira (AM 72573).

Didelphis marsupialis Linnaeus, 1758

Black-eared Opossum
and Carachupa Grande

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Didelphis marsupialis* was described by Linnaeus (1758: 54), type locality "America," restricted by Thomas (1911c: 143) to "Surinam." *Didelphys aurita* was described by Wied-Neuwied (1826: 393); type locality "Villa Vicosa am Flusse Paruhype," or "rio Peruibe, estado de Espirito Santo, Brasil" (Cabrera, 1958: 42). See discussion of the names *Didelphis azarae* and *D. paraguayensis* in the account of *D. albiventris*.

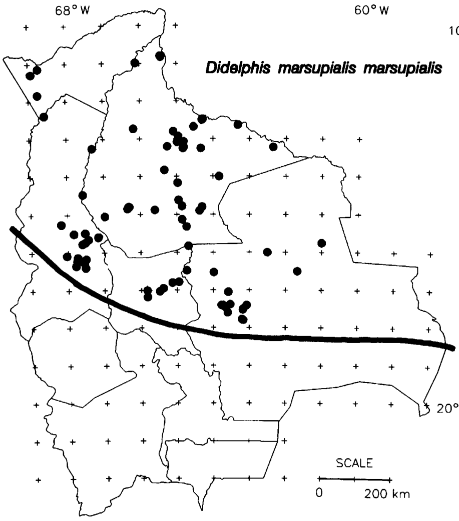


Fig. 487. Localities of known occurrence of *Didelphis marsupialis marsupialis*.

"Is *D. marsupialis* the same species as *D. aurita*?" This question was raised by Cerqueira (1985: 143), who mapped a disjunct range in southeastern Brazil for the latter. Gardner (*in* Wilson and Reeder, 1993: 16) answered this question in the negative; thus, the name used here for the Bolivian population is *Didelphis marsupialis marsupialis*.

Morphological Characters and Comparisons: Measurements in tables 2 and 3 are of specimens from Caranavi (MSU 28236), 1.5 km NW of Guayaramarin (AM 210438), 7 km N and 17 km W of Buenavista (AM 246455), San Miguel Rincón (AM 260042), and 6 km W of Casarabe (255852–255855).

Distributional Notes: Known localities are listed below and mapped (fig. 487).

Habitat: Various habitats in the lowlands and up into the Yungas to at least an elevation of 2700 m (Astillero).

No detailed Bolivian data are available on habits, behavior, or food.

Parasitology: Fonseca (1960: 92) reported *Ixodes luciae* from "*Didelphys paraguayensis*" from Buen Retiro. Brennan (1970: 810) reported the chigger, *Eutrombicula alfreddugesi*, from 4 km SW of Costa Marques (1230/6418).

REPRODUCTION: Data are available on 11 adult females; 7 had no embryos or pouch young, 4 had young in the pouch (1 in August with 6, 2 in September and October with 7, and 1 in unknown month with 8).

Scientific synonyms used for Bolivian specimens are:

Didelphis marsupialis marsupialis
Linnaeus, 1758

Didelphis marsupialis: Cerqueira, 1985: 135 (map). Brennan, 1970: 810 (chiggers, 1230/6418). Cabot et al., 1986: 42 (name in list). Valette et al., 1988: 139 (hosts of *Trypanosoma cruzi* from Yungas of La Paz). Cameron et al, 1989: 69 (a skin seen in western Pando). Stearman, 1990: 380 (Yuquí camp at 1647/6457). Emmons and Feer, 1990: 15 (mentioned Bolivia).

Didelphys aurita: Alston, 1879: 197 (Bolivia). Arce Pereira et al., 1963: 152 (name in list; Todos Santos).

Didelphis marsupialis aurita: Allen, 1902: 265 (eastern Bolivia). Anderson, 1985b: 6 (name in list). Anderson, 1993: 20 (general distributional records). Anderson et al., 1993: 19 (vicinity of Santa Cruz de la Sierra).

Didelphis azarae: Allen, 1902: 271 ("Dept. de la Paz," perhaps referring to specimens from specific localities within the department).

Didelphys paraguayensis: Fonseca, 1960: 92 (ectoparasites from Buen Retiro, 1717/6338, host identification uncertain, I have not seen a voucher specimen).

LOCALITIES (77) AND SPECIMENS (249): **Beni:** 1048/6526, 1.5 km NW of Guayaramerin, 2 AM; 1049/6525, Guayaramerin, 3 AM; 1059/6606, Riberalta, 3 US; 1229/6417, río Iténez, opposite Costa Marquez [Brazil], 15 AM; 1230/6418, 0.5 km S of río Iténez and 4 km SW of Costa Marquez, 15 AM; 1241/6432, 15 km above Horquilla, on río Machupo, 1 AM; 1244/6318, Versalles, 1 AM; 1248/6505, Puerto Siles, 1 AM; 1258/6459, Azunta, 2 FM; 1304/6448, Camino Vilches, 1 FM; 1304/6449, San Joaquín, 12 FM; 1305/6453, Aserradero Monte de San Pablo, 7 MNK; 1305/6459, San Pablo village, 3 MNK; 1312/6515, 8 km N of Exaltación, 9 AM; 1313/6221, 20 km W Larangeiras, 1 AM; 1313/6448, Barranquita, 4 FM; 1315/6420, Piedras Blancas, 7 MNK; 1315/6449, Yutiole, 1 AM; 1350/6520, río Mamoré on W side, 1 AM; 1400/6350, Los Totumu, 14 MNK; 1410/6458, 5 km above mouth of río Tijamuchi, 1 AM; 1428/6734, Rurrenabaque, 1 AM; 1437/6457, río Ibare at mouth, 6 AM; 1447/6451, río Ibare, 27 km above mouth, 1 AM; 1448/6418, Ibiato, 1 MNK; 1448/6618, 2 km E of El Trapiche, 1 MNLP; 1448/6619, Campamento El Trapiche, 2 MNLP; 1451/6621, Reserva Biológica del Beni, 1 EBD; 1453/6536, San Ignacio de Moxos, 1 Oklahoma State University Museum (not seen); 1454/6422, 6 km W of Casarabe, 4 AM; 1503/6658, 1 km E of La Embocada, 1 UMMZ; 1508/6451, 10 km E San Antonio, 1 AM; 1519/6444, Camiaco, 1 AM; 1550/6441, río Mamoré, 5 km NW of mouth of río Grande, 1 AM. **Cochabamba:** 1647/6457, Campamento Yuqui, 2 MNLP; 1648/6508, Todos Santos, 1 AM; 1657/6523, 2 km E of Villa Tunari, 8 AM; 1657/6523, Hotel Las Pozas, Villa Tunari, 2 EBD; 1700/6550, Yungas, 2 AM; 1702/6529, 3 km SW of Villa Tunari, 1 AM; 1711/6549, Chapare, 2 BM. **La Paz:** 1315/6718, río Beni, 1 MNLP; 1515/6810, Mapiri, 2 AM, 1 BM; 1529/6731, 1 mi [= 1.6 km, also published as 2 km] W of Puerto Linares, 1 MSU, 1 TTU; 1530/6750, 5 km SE of Guanay on río Challana, 2 UMMZ; 1534/6716, Palos Blancos, 1 AM; 1539/6726, 2 km W of Entre Ríos, 1 AM; 1544/6731, La Reserva, 840 m, 3 AM, 2 CBF, 3 MSB; 1546/6736, Caranavi, 2 MSU, 1 TTU; 1605/6802, El Vertigo, Zongo Valley, 1 AM; 1608/6744, Chijchipani, 1 AM; 1609/6744, Chijchijpa, 1 AM; 1610/6730, Yuncas, 2 US, 1 BM; 1614/6745, Yolosito, 8 AM; 1616/6733, Astillero, 1 BM; 1621/6747, Pitiguaya, 2 AM; 1624/6731, Chulumani, 1 BM. **Pando:** 1108/6844, 10 km S of Cobija, 1 US; 1117/6855, río Nareuda, 3 AM; 1150/6845, Manuripi Heath National Wildlife Reserve, 7 MNK; 1223/6835, Isla Gargantua, 1 AM. **Santa Cruz:** 1545/6100, Los Palmares, 7 MNK; 1600/6230, Totaitu, 10 MNK; 1629/6444, río Ichilo, 54 km S of mouth of río Chapare, 1 AM; 1630/6140, Zapoco, 5 MNK; 1632/6359, Yapacaní, 2 BM; 1703/6335, 7 km N Santa Rosa, 1 CM, 4 IML; 1723/6332, San Miguel Rincón, 4 AM, 1 MSB; 1724/6304, Tocomechi, 15 km NE Warnes, 1 US; 1724/6344, 7 km N and 17 km W of Buenavista, 1 AM; 1724/6346, río Yapacaní, 2 FM; 1727/6340, Buenavista, 2 ANSP, 3 BM, 2 FM; 1730/6310, Warnes, 1 US; 1731/6311, Santa Rosita, 1 US; 1736/6336, San Rafael de Amboró, 1 AM, 1 MSB; 1748/6310, Santa Cruz de la Sierra, 2 CM; 1747/6312, Km 5 on road toward Cochabamba, 1 AM. **Department uncertain:** coordinates unknown, perhaps Beni, 1 MNK.

Genus *Gracilinanus*
Gardner and Creighton, 1989

TAXONOMIC REMARKS: The genus *Gracilinanus* was reviewed by Hershkovitz (1992b) and three new species were described. One of these, *G. kalinowskii*, has its type locality at "Hacienda Cadena, Marcapata, 13°20′S, 70°46′W, Cuzco, Peru, 890 m". Both geographic proximity and continuity of habitat suggest that the species may occur in Bolivia. *Gracilinanus aceramarcae* was said (Hershkovitz, 1992b: 38) to differ from *G. kalinowskii* in "narrow pointed muzzle, highly fenestrated palate, narrow zygomata, dark underparts, and overall larger size." Since the comparison is based on only two specimens plus description of one in the literature, the taxonomic status of these species will need to be critically reviewed again when more specimens can be assembled and compared.

Gracilinanus aceramarcae (Tate), 1931

MORPHOLOGICAL CHARACTERS AND COMPARISONS: According to Tate (1933: 202) *Gracilinanus aceramarcae* "may be distinguished from *unduaviensis* [now placed in *G. agilis*] by its quite different color, lack of incipient middorsal stripe, presence of numerous long over-hairs in the coat, much smaller teeth, and the extreme slenderness of the upper part of the ascending ramus of the mandible." Measurements in tables 2 and 3 are of specimens from río Aceramarca (AM 72568, UM 156004, and 156005).

DISTRIBUTIONAL NOTES: Until recently, known only from Bolivia. One example from Peru, obtained by J. L. Patton, was reported by Pacheco et al. (1995: 5), exact locality not given. See list below and map in figure 488.

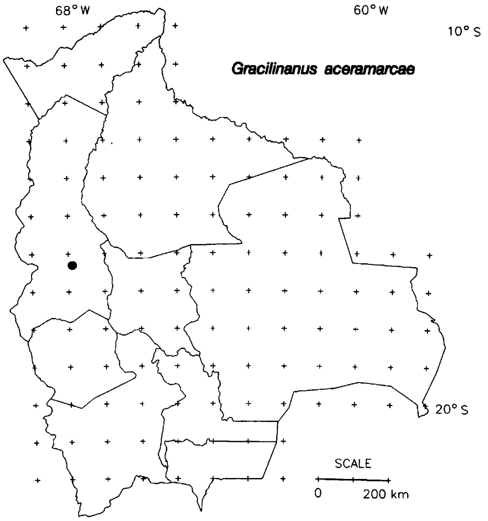


Fig. 488. Localities of known occurrence of *Gracilinanus aceramarcae.*

No specific or detailed information on habitat, habits, behavior, food, or reproduction are available.

Scientific synonyms used for Bolivian specimens are:

Marmosa aceramarcae Tate, 1931b: 12 (type locality río Aceramarca, department of La Paz, Bolivia). Anderson, 1985b: 6 (name in list).

Gracilinanus aceramarcae: Gardner and Creighton, 1989: 5. Hershkovitz, 1992b: 32 (Aceramarca). Anderson, 1993: 18 (general distributional records). Lawrence, 1993: 13 (río Aceramarca).

LOCALITIES (2) AND SPECIMENS (3): **La Paz:** 1618/6753, holotype, 1 AM; 1618/6754, río Aceramarca, 1 km S of Yerbani, 2 UMMZ.

Gracilinanus agilis
(Burmeister), 1854

This species has no unique vernacular name. Scientific synonyms are under subspecies below.

TAXONOMIC REMARKS: The name for the species has its type locality outside of Bolivia. *Grymaeomys agilis* was described by Burmeister (1854: 139), type locality Lagoa Santa, Minas Gerais, Brazil. *Marmosa agilis* was placed in the subgenus *Thylamys* by Cabrera (1958: 27) but not by Palma (1995).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: According to Tate (1933: 193), *Gracilinanus agilis* varies in color from dull, dusty brown in the subspecies *G. a. agilis* to grayish brown in *G. a. buenavistae*. The "fur lies smooth and close, and is very uniform in length." There is a midventral area of completely whitish hairs. The vibrissae are short. The skull was said to have scarcely any characters of specific value; *G. agilis* was included in the "*microtarsus* group," which, among Bolivian taxa, included also *G. aceramarcae*, *Marmosa lepida*, and *Marmosa unduaviensis*. Tate noted, however, that "apart from small size and brown or cinnamon coloration, the *microtarsus* and *lepida* sections [of the *microtarsus* group] have little in common." Tate (1933) placed *Marmosa unduaviensis* in his *microtarsus* group. Among characters noted by Tate were dorsum brownish, face scarcely paler; venter buffy or creamy; pelage long and lax, with two series of short, stiff hairs on the mid ventral line of the throat and areas of long, erect, unstiffened, brown-tipped hairs extending from beneath the ears to the forelimbs; ears small and fuscous brown; vibrissae short and black; feet small and buffy brown; and tail short and fuscous brown.

DISTRIBUTIONAL NOTES: See list below and map in figure 489.

No information for Bolivia is available on habitat, habits, behavior, or food.

PARASITES: Several species of fleas have been reported: *Adoratopsylla* (*Tritopsylla*) *intermedia intermedia* from Aqua Hedionda and Buen Retiro (Hopkins and Rothschild, 1966: 120); *Rhopalopsyllus lugubris lugubris* from Buen Retiro (Smit, 1987: 205); *Rhopalopsyllus australis tamoyus* from Buen Retiro (Smit, 1987: 212); *Rhopalopsyllus cacicus* from Buen Retiro (Smit, 1987: 218); *Polygenis* (*Gephyropsylla*) *klagesi samuelis* from Buen Retiro (Smit, 1987: 250); *Polygenis* (*Polygenis*) *roberti beebei* from Buen Retiro (Smit, 1987: 281); and *Polygenis* (*Polygenis*) *tripus* from Gutierrez (Smit, 1987: 303).

REPRODUCTION: One female taken in October had no embryos; otherwise no data are available.

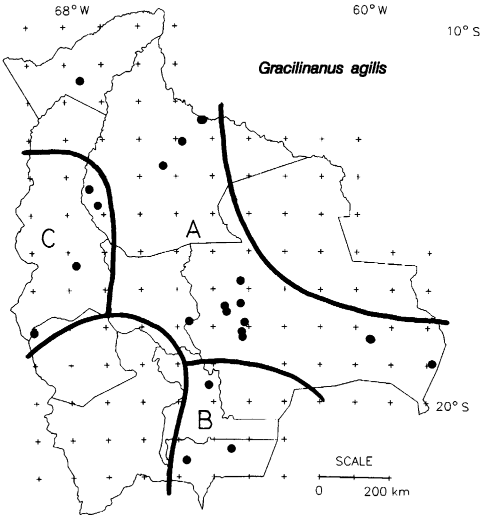


Fig. 489. Localities of known occurrence of *Gracilinanus agilis* and its Bolivian subspecies, *G. agilis buenavistae* (A), *G. agilis chacoensis* (B), and *G. agilis unduaviensis* (C).

Gracilinanus agilis buenavistae (Tate), 1931

Marmosa agilis buenavistae Tate, 1931b: 10 (type locality Buenavista, Santa Cruz, Bolivia). Tate, 1933: 197 (7 in BM, 1 in CM). Hopkins and Rothschild, 1966: 120 (fleas from Agua Hedionda [1810/6344] and Buen Retiro [1716/6345]). Anderson, 1985b: 6 (name in list). Smit, 1987: 205, 212, 218, 250, 281, 303 (fleas from Buena Vista and Gutierrez).

Gracilinanus agilis: Gardner and Creighton, 1989: 5(*buenavistae* in synonymy). Hershkovitz, 1992b: 53 (San Joaquín, Buenavista, Palometitlas, Santiago, Puerto Suárez, and Lago Balzon).

Marmosa agilis: Hinojosa *in* Estenssoro, 1992a (collected in Chimane region). Hinojosa, 1991, 1992b (Serranía Eva Eva).

Gracilinanus agilis buenavistae: Anderson, 1993: 18 (general distributional records).

Marmosa (*Gracilinanus*) *agilis buenavistae*: Anderson et al., 1993: 16 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (19) AND SPECIMENS (57): **Beni:** 1230/6415, Pampa de Meio, 5 AM; 1230/6418, mouth of río Baures, 2 AM; 1304/6449, San Joaquín, 30 FM; 1343/6521, Puerto Caballo, 1 AM. 1452/6707, Km 35 NW of Yucumo, 1 CBF. **Cochabamba:** 1751/6440, 25 km by road W of Comarapa, 1 UMMZ. **Pando:** 1126/6734, Independencia, 2 AM. **Santa Cruz:** 1647/6314, Estancia Cachuela Esperanza, 1 AM; 1723/6314, 3 km SE Montero, 1 km N of Villa Copacabana, 1 MSB; 1727/6340, Buenavista, 2 BM (28.29.93, 26.12.4.91 the holotype, 28.12.4.93), 1 CM (2168, referred to by Tate, 1933: 198, as from Province of Sara); 1736/6337, río Palomotitlas, Buenavista, 1 BM (28.2.9.89); 1753/6307, Las Lomitas, 15 km S of Santa Cruz, 1 MNK, 1 MSB; 1808/6312, 7 km E and 3 km N of Ingeniero Mora, 1 AM; 1816/6311, 3 km N of Zanja Honda, Hacienda El Pelícano, 1 AM; 1818/5936, 4 km N and 1 km W of Santiago de Chiquitos, 1 AM; 1819/5934, Santiago, province of Chiquitos, 1 FM; 1857/5751, Puerto Suárez, 1 CM. **Department unknown:** coordinates unknown, Lake Balzon, 1 BM (Tate, 1933).

Measurements in tables 2 and 3 are of specimens from Independencia (AM 262401), Estancia Cachuela Esperanza (AM 260031), and río Palomotitlas (BM 28.2.9.93 and 26.12.4.91).

Gracilinanus agilis chacoensis (Tate), 1933

Marmosa janetta: Thomas, 1926b: 327 (one specimen, Budín field number 1809, presumably was the basis for the citing of Tablada for *G. agilis* by Hershkovitz, 1992b: 53).

Marmosa agilis chacoensis: Tate, 1933: 197 (type locality Sapucay, Chaco, Paraguay; one from Villa Montes). Gonzalez, 1985: 2 (sur de Bolivia).

Marmosa agilis agilis: Tate, 1931b: 10 (first use of name combination). Cabrera, 1958: 27 (first use of name combination for Bolivian specimen). Anderson, 1985b: 6 (name in list).

Marmosa agilis: Krumbiegel, 1941b (Villa Montes).

Gracilinanus agilis: Gardner and Creighton, 1989: 5 (*chacoensis* in synonymy). Hershkovitz, 1992b: 53 (Villa Montes, Tablada).

Gracilinanus agilis chacoensis: Anderson, 1993: 18 (general distributional records).

LOCALITIES (3) AND SPECIMENS (4): **Chuquisaca:** 1933/6408, río Limón, 1 MSB. **Tarija:** 2115/6330, Villa Montes, upper río Pilcomayo, 1 CBF, 1 (Tate, 1933; Krumbiegel, 1941b). 2133/6447, Tablada, 1 FM (29169, formerly at BM, field no. Budín 1809, see Thomas, 1926b: 327, presumably the basis for the report of *G. agilis* from this locality by Hershkovitz, 1992b: 53).

Gracilinanus agilis unduaviensis (Tate), 1931

Marmosa unduaviensis Tate, 1931b: 11 (type locality Pitiguaya, on río Unduavi, La Paz, Bolivia). Tate, 1933: 201. Anderson, 1985b: 6 (name in list).

Gracilinanus agilis: Gardner and Creighton, 1989: 5 (*unduaviensis* in synonymy). Patterson, 1992: 7 (Reyes, suggested that "if subspecific distinction of central Bolivian material were warranted . . . the name *buenavistae* would apply"). Hershkovitz, 1992b: 53 (Reyes, Pitiguaya, Sajama). Lawrence, 1993: 13 (Pitiguaya).

Marmosa undaviensis: Hershkovitz, 1992b: 34 (misspelling in synonymy).

Gracilinanus agilis unduaviensis: Anderson, 1993: 18 (Pitiguaya).

LOCALITIES (3) AND SPECIMENS (7): **Beni:** 1419/6723, Reyes, 1 (Patterson, 1992). **La Paz:** 1621/6747, Pitiguaya, 2 AM; 3 UMMZ. **Oruro:** 1807/6900, Mount Sajama, 1 FM [54255].

Measurements in tables 2 and 3 are of specimens from Pitiguaya (AM 72563 and UM 156007).

Hershkovitz (1992b: 53) assigned the specimen from Sajama to *G. agilis*, but not to a subspecies.

Genus *Lutreolina* Thomas, 1910

These semiaquatic opossums have been called otter-opossums.

Lutreolina crassicaudata (Desmarest), 1804

Comadreja Colorada and Lesser Water Opossum

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Didelphys crassicaudata* was described by Desmarest (1804: 19), type locality restricted to Asunción, Paraguay, by Cabrera (1958: 39). Thomas (1923a: 584) first used the name combination *Lutreolina crassicaudata crassicaudata*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: The presence of an abdominal pouch was reported by Lemke et al. (1982: 227). The body is relatively long and the limbs are relatively short, so that a resembl-

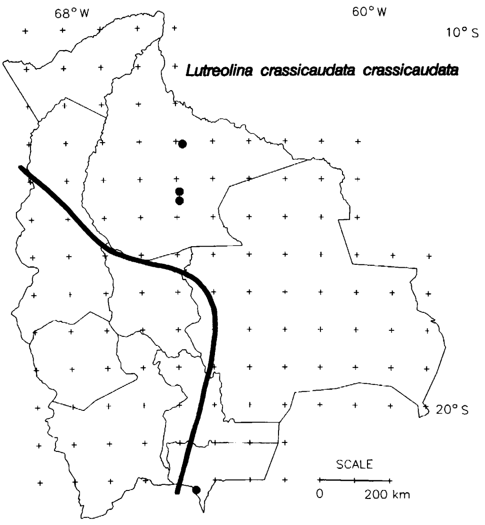


Fig. 490. Localities of known occurrence of *Lutreolina crassicaudata crassicaudata*.

ence to a mink is evident in build also. The hind part of the body seems to taper into the broad base of the tail. The pelage is a strong brown. Measurements in tables 2 and 3 are of specimens from San Joaquín (FM 114716, US 364720), 23 km W of San Javier (AM 210419–210424), and 10 km W of San Pedro (AM 210425).

Distributional Notes: Known localities are listed below and mapped (fig. 490).

Habitat: They inhabit areas with dense ground cover, including marshy or swampy areas at low elevations.

Habits and Behavior: They move rapidly as do otters, minks, and many other mustelids rather than slowly as do many other opossums. "It dives and swims with ease in the small *lagunas* (lagoons) dotted over the pampas, constructing a globular nest of grass suspended from the flags and rushes which abound in such spots" (Lydekker, 1894: 204).

No specific information is available of food or reproduction.

Scientific synonyms used for Bolivian specimens are:

Lutreolina crassicaudata crassicaudata (Desmarest), 1804

Lutreolina crassicaudata crassicaudata: Marshall, 1978b: 2 (San Joaquín). Anderson, 1985b: 6 (name in list). Anderson, 1993: 19 (general distributional records).

Lutreolina crassicaudata: Hershkovitz, 1972: 403 (San Joaquin); Lemke et al., 1982: 227 (San Joaquín).

Localities (4) and Specimens (10): **Beni:** 1304/6449, San Joaquín, 1 FM, 1 US; 1420/6455, 10 km W of San Pedro, 1 AM; 1434/6455, 23 km W of San Javier, 6 AM. **Tarija:** 2216/6433, 3 km SE of Cuyambuyo, 1 CBF.

Genus *Marmosa* Gray, 1821

These little opposums vary from mouse-sized to rat-sized. Their only conspicuous markings are black eye-rings or facial mask. The ears are rather large and curl inward from the margins when the animal is alarmed. The tail is usually longer than the head plus body. There is no abdominal pouch.

Taxonomic Remarks: The genus *Marmosa* formerly included species now referred to five genera—*Marmosa*, *Gracilinanus*, *Marmosops*, *Micoureus*, and *Thylamys*. These have been treated as subgenera by some authors. The last comprehensive revision of *Marmosa* was by Tate (1933). Cabrera (1958) rearranged the taxa of *Marmosa* somewhat but the reasons were largely unstated. A preliminary list of species was published by Pine and Collins (1973). Kirsch and Calaby (1977) recognized three subgenera of *Marmosa* (*Marmosa*, *Thylamys*, and *Stegomarmosa*), two of which occur in Bolivia. One of these, the subgenus *Marmosa*, has been further divided and the parts raised to genera (*Marmosa* and *Micoureus*) by Marshall (in Anderson and Jones, 1984). The three Bolivian genera of Marshall's useage are: *Thylamys* (equivalent to the *microtarsus* group plus the *elegans* group of Tate as discussed below), *Micoureus* (equivalent to the *cinerea* group of Tate), and *Marmosa* (equivalent to the *noctivaga* group of Tate), at least in regard to Bolivian material. Some of the southern representatives of the genus were reviewed by Creighton (1984). A family Marmosidae, with five subfamilies, was recognized by Hershkovitz (1992a). The subfamilies are Marmosinae, Thylamyinae, Lestodelphyinae, Metachirinae, and Monodelphinae.

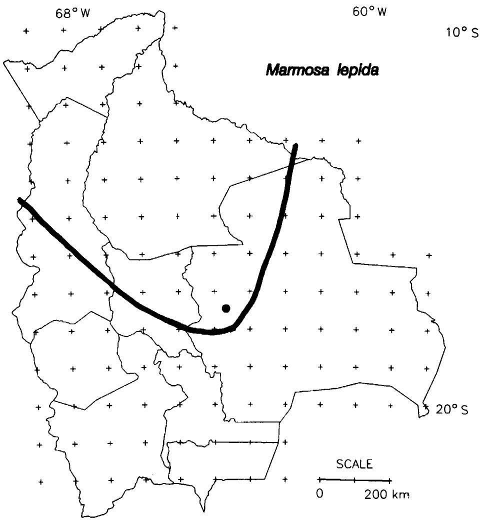


Fig. 491. Localities of known occurrence of *Marmosa lepida.*

The "Marmosa group" of genera needs further critical revision with more material. The present grouping of species in five genera follows Gardner and Creighton (1989) and the species are those recognized by Gardner (*in* Wilson and Reeder, 1993).

Marmosa lepida (Thomas), 1888

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Didelphys* (*Micoureus*) *lepida* was described by Thomas (1888a: 158), type locality "Peruvian Amazons," or Huallaga River, Santa Cruz, Loreto, Peru (Thomas, 1888b: 348).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: A relatively unfenestrated palate, abdominal mammae (none pectoral), and rich reddish brown pelage were noted by Tate (1933) in *Marmosa lepida.* The ears were said to be small and the eye-ring not extending more than 2 mm behind the eye. Measurements in tables 2 and 3 are of specimens from Buenavista (ANSP 14276 and BM 26.12.4.94).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped (fig. 491).

No information for Bolivia is available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Didelphys (*Micoureus*) *lepida*: Thomas, 1888b: 348 (one from "Bolivia").

Marmosa lepida lepida: Tate, 1933: 205 (one from Buenavista, two without definite localities).

Marmosa lepida grandis: Tate, 1933: 207 (two from Buenavista).

Marmosa lepida: Cabrera, 1958: 18 (as monotypic species). Anderson, 1985b: 6 (name in list). Eisenberg, 1989: 37 (mentioned Bolivia). Emmons and Feer, 1990: 24 (mentioned Bolivia). Anderson, 1993: 18 (Buenavista).

Thylamys lepida: Corbett and Hill, 1991: 10 (name in list).

Marmosa (*Marmosa*) *lepida*: Anderson et al., 1993: 16 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (2) AND SPECIMENS (7): **Santa Cruz:** 1727/6340, Buenavista, 3 BM, 1 ANSP. **Department unknown:** coordinates unknown, Bolivia, no precise locality, 3 BM.

Marmosa murina (Linnaeus), 1758

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Didelphis murina* was described by Linnaeus (1758: 56), type locality "Asia, America," restricted to "Surinam" by Thomas, 1911c: 144). Burmeister (1869: 455) reported two skins and a skull from Santa Cruz de la Sierra under the name *Didelphys dorsigera*, but I have not seen these specimens. Cabrera (1958: 19) listed this name as a synonym of *Marmosa murina.* Patterson (1992: 71) suggested that the specimen from Puerto Salinas might be "racially distinct." Cabrera (1958: 18) recognized seven subspecies of *M. murina.* The subspecies with its type locality nearest to Bolivia is *M. murina meridionalis* Miranda Ribeiro, 1936, from Mato Grosso, Brazil. Pending more detailed study of geographic variation in the species, I refrain from using the subspecies in this case.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 2 and 3 are of a specimen from 1 km E La Embocada (UM 155828).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped (fig. 492).

No detailed Bolivian data are available on habitat, habits, behavior, or food.

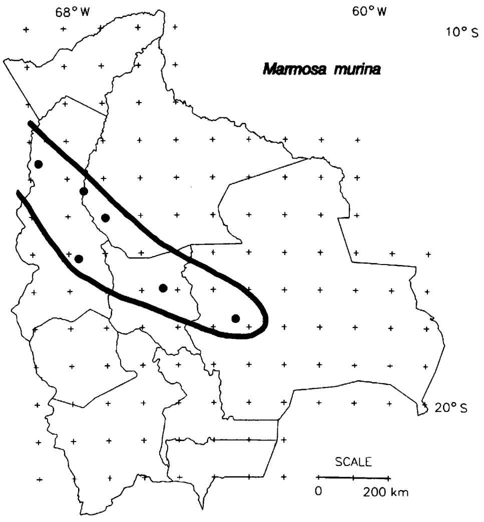


Fig. 492. Localities of known occurrence of *Marmosa murina.*

Reproduction: One female taken in July had no embryos or attached young; otherwise no data are available.

Scientific synonym used for Bolivian specimens is:

Marmosa murina: Arce Pereira et al., 1963: 152 (name in list; Todos Santos). Patterson, 1992: 7 (Puerto Salinas). Emmons, 1991: 72 (Alto río Madidi). Anderson, 1993: 18 (possible occurrence in Beni).

Localities (7) and Specimens (13): **Beni:** 1420/6733, Puerto Salinas, 1 (Patterson, 1992: 21); coordinates unknown, Centenela, 1 FM; 1503/6658, 1 km E of La Embocada, 5 UMMZ. **Cochabamba:** 1657/6524, 0.5 km NE of Villa Tunari, 1 UMMZ. **La Paz:** 1335/6846, Moira Camp, Alto río Madidi, 1 CBF, 1 USNM; 1608/6744, Chijchipani, 1 AM, 1 MSB. **Santa Cruz:** 1747/6322, 2 km SW of Las Cruces, 480 m, 1 MSB.

"*Marmosa*," species not determined

Localities (29) and Specimens (91): **Beni:** 1304/6449, San Joaquín, 7 US; 1306/6449, San Juan de Fribol, 1 FM; [114669] 1320/6408, Magdalena, 1 US; 1428/6734, Rurrenabaque, 1 AM; 1536/6638, Sierra Eva Eva, campamento Arroyo Chontal, 1 IE. **Cochabamba:** 1647/6457, Campamento Yuqui, 1 MNLP; 1714/6541, Incachaca, 1 ANSP [19402], 1 CM [5244]; 1724/6609, Cochabamba (assumed to be the city), 1 MACN (not examined), + 11 in owl pellets in a collection in La Paz. **Chuquisaca:** 1946/6353, 70 km SE of Padilla, 2 FM [106094–106095]. **La Paz:** 1545/6731, 1 km S of La Reserva, 1 CBF; 1553/6752, 30 km by road N of Zongo, 3 UMMZ [156001–156003]; 1604/6800, 18 km by road N of Zongo, 2 UMMZ [155999–156000]; 1710/6755, Huaraco, 1 IE. **Pando:** 1117/6650, río Madre de Dios, opposite Genechiquia, 1 AM. **Santa Cruz:** 1600/6230, Totaitu, 1 MNK; 1615/6204, Concepcion, 1 from owl pellet in La Paz; 1647/6314, Estancia Cachuela Esperanza, 1 AM; 1722/6325, province of Sara, 1 BM (not seen); 1727/6340, Buena Vista, 4 MACN (not seen); 1745/6257, Cotoca, 1 AM, plus other material (4 specimens) from owl pellets in a collection in La Paz; 1748/6310, Santa Cruz de la Sierra, 1 AM, 6 MACN (not seen), 4 from owl pellets in a collection in La Paz; 1753/6249, Puerto Lomas Arena, 1 MNK; 1800/6428, 2.5 km N of Tambo, 1 AM; 1808/6312, 7 km E and 3 km N of Ingeniero Mora, 1 AM. **Tarija:** 2119/6325, 8 km S and 10 km E of Villa Montes, 11 AM, 1 MNLP; 2128/6317, 35 km by road SE of Villa Montes, Taranguiti, 13 UMMZ; [155837–155841 = perhaps *pusilla*]; 2131/6445, Tarija (assumed to be the city), 1 MACN (not seen); 2202/6345, Yacuiba, 1 MACN (not seen); 2241/6426, río Lipeo, 1 ANSP [18190].

Genus *Marmosops* Matschie, 1916

Marmosops dorothea (Thomas), 1911

This species has no unique vernacular name. The source of the name *dorothea* was not given in the original description of *Marmosa dorothea.*

Taxonomic Remarks: The type localities of three names now referred to as *Marmosops dorothea* are in Bolivia, as noted in the synonymy below. I have not attempted to decide whether geographic differences exist that would warrant the use of subspecies names.

Morphological Characters and Comparisons: Tate (1933) noted that *Marmosa ocellata* is pale gray-brown dorsally, broadly creamy white ventrally, and has strongly de-

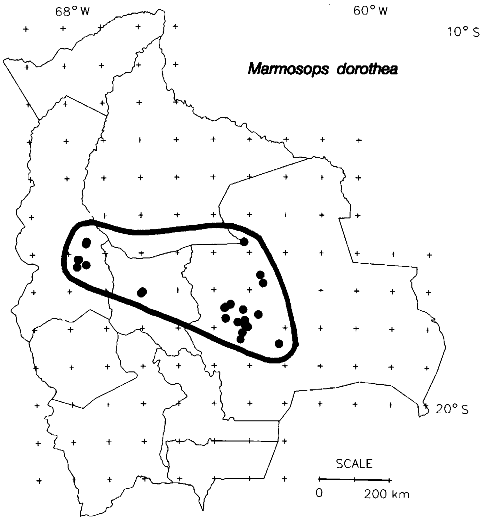


Fig. 493. Localities of known occurrence of *Marmosops dorothea.*

veloped eye-rings. The skull has a narrow interorbital region and small molars. The tail is clothed with fine white hairs. The ears are large, pale fuscous, semitranslucent, and profusely haired terminally. The throat gland is well developed. Dorsal pelage is 9–10 mm long. The skull is heavily built and without supraorbital prominences or beading. The palate is relatively narrow and highly fenestrated. (All of these characters need to be tested with larger series of specimens.) Measurements in tables 2 and 3 are of specimens from Buenavista (BM 26.1.5.25, holotype of *ocellata*, 28.2.9.87, 28.8.9.90), Pitiguaya (AM 72550, 72558, holotype of *yungasensis*), Chijchipani (AM 262409), and río Solocame (BM 1.6.7.79, holotype of *dorothea*).

Distributional Notes: Known localities are listed below and mapped (fig. 493).

No detailed information is available on habitat, habits, behavior, or food.

Reproduction: Data are available for 10 females; 8 had no embryos; 2 taken in July and October had 2 embryos each.

Scientific synonyms used for Bolivian specimens are:

Marmosa dorothea Thomas, 1911a: 516 (type locality "Río Solocame, 67°W, 16°S, Alt. 2300 m." in La Paz department, Bolivia).

Marmosa ocellata Tate, 1931b: 7 (type locality Buenavista, Santa Cruz, Bolivia). Tate, 1933: 162. Anderson, 1985b: 6 (name in list).

Marmosa noctivaga dorothea: Tate, 1933: 158 (río Solocame and Mapiri).

Marmosa yungasensis Tate, 1931b: 7 (type locality Pitiguaya, La Paz, Bolivia). Tate, 1933: 160.

Marmosa noctivaga keaysi: Cabrera, 1958: 21 (listed *Marmosa dorothea* as a synonym of *M. n. keaysi*).

Marmosops dorothea: Gardner *in* Wilson and Reeder, 1993: 19 (*ocellata* and *yungasensis* in synonymy). Anderson, 1993: 19 (general distributional records). Lawrence, 1993: 12 (Pitiguaya).

Marmosa (*Marmosops*) *dorothea ocellata*: Anderson et al., 1993: 17 (vicinity of Santa Cruz de la Sierra).

Localities (23) and Specimens (46): **La Paz:** 1541/6730, Serrania Bella Vista, 1525 m, 1 AM; 1544/6731, La Reserva, 840 m, 1 MSB; 1609/6745, Chijchijpa, 1114 m, 1 MSB; 1618/6732, río Solocame, 1 BM, 1 CBF; 1621/6747, Pitiguaya, 8 AM. **Santa Cruz:** 1543/6309, 6 km by road W of Ascención, 1 AM; 1636/6242, 10 km N of San Ramón, 2 AM, 1 MSB; 1649/6237, Palmarito on río San Julian, 1 CM; 1723/6332, San Miguel Rincón, 1 AM; coordinates unknown, Cerro Hosana, 1 CM; 1727/6340, Buenavista, 3 BM, 1 CM, 1 FM; 1728/6342, 4 km SW of Buena Vista, 1 Hayward collection; 1731/6311, Santa Rosita, 1 US; 1739/6245, 3.5 km W of Estación Pailón, 3 AM, 1 MSB; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitisama, 1 MSB; 1748/6308, El Palmar Road, 7 km SE of Santa Cruz, 1 US; 1751/6320, 1 km E of Ayacucho, 2 US; 1753/6307, 15 km S of Santa Cruz, 5 MSB; 1755/6308, 15 km S of Santa Cruz, Las Lomitas, 1 MSB; 1758/6303, 27 km SE of Santa Cruz, 2 MSB; 1808/6312, 7 km E and 3 km N of Ingeniero Mora, 1 AM; 1816/6311, Hacienda Pelicano, 3 km N of Zanja Honda, 1 AM; 1825/6210, Tita, 1 MSB.

Marmosops impavidus
(Tschudi), 1845

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Didelphis impavida* was described by Tschudi (1845: 148), type locality "Der Mittleren und tiefen Waldregion," re-

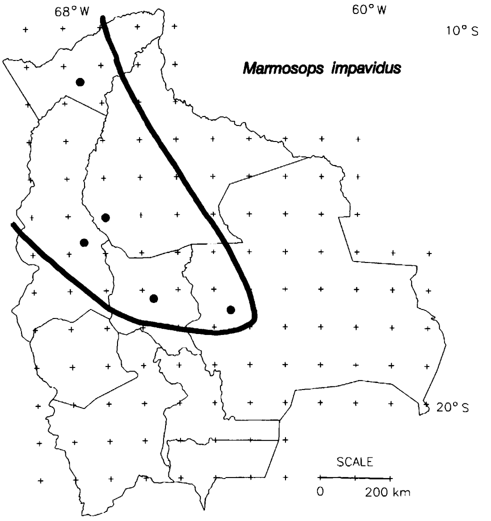


Fig. 494. Localities of known occurrence of *Marmosops impavidus.*

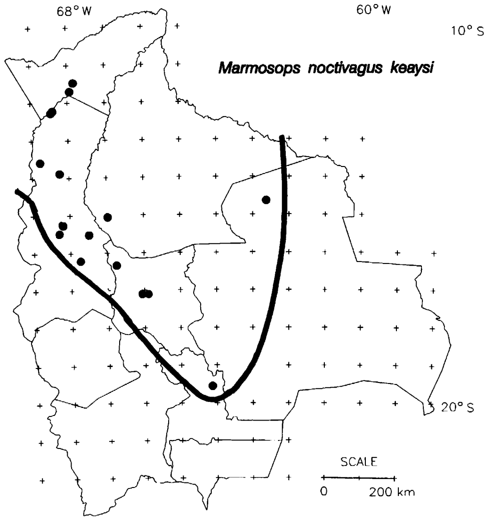


Fig. 495. Localities of known occurrence of *Marmosops noctivagus keaysi.*

stricted by Cabrera (1958: 16) to "Montana de Vitoc, cerca de Chanchamayo" in Junín, Peru. Tate (1933: 25) regarded *impavida* as unidentifiable; however, Cabrera (1958: 16) allied *Marmosa impavida* to Tate's *Marmosa caucae* and included six subspecies. The subspecies with its type locality nearest to Bolivia is *M. i. albiventris* Tate (1931b: 9) from Torontoy, near Cuzco, Peru. No attempt is made here to assign the Bolivian specimens to subspecies.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 2 and 3 are of a specimen from Incachaca (AM 38718), 1 km E La Embocada (UM 156014), and 20 km NNE Caranavi (UM 126680). Size small (total length less than 210 mm, generally 180 to 190); dorsally fuscous; without, or almost without, traces of supraorbital ridges.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped (fig. 494).

No information is available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Marmosa impavida: Anderson, 1985b: 6 (name in list). Corbet and Hill, 1991: 9 (name in list).

Marmosops impavida: Anderson, 1993: 19 (general distributional records).

LOCALITIES (5) AND SPECIMENS (6): **Beni:** 1503/6658, 1 km E Embocada, 1 UMMZ. **Cochabamba:** 1714/6541, Incachaca, 2 AM. **La Paz:** 1542/6735, 20 km by road NNE of Caranavi, 1 UMMZ. **Pando:** 1126/6734, Independencia, 1 MSB. **Santa Cruz:** 1733/6332, 2 km S of Caranda, 1 MSB.

Marmosops noctivagus (Tschudi), 1845

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia; *Didelphis noctivaga* was described by Tschudi (1845: 148), type locality "Der Mittleren und tiefen Waldregion" restricted by Tate (1933: 158) to Peru, Junin, Mantana de Vitoc, near Chanchamayo, Río Perene drainage. Tate (1933: 158) first used the name combination *Marmosa noctivaga keaysi. Thylamys keaysi* was described by Allen (1900c: 198); type locality Inca Mines, Cuzco, Peru.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 2 and 3 are of specimens from the Yungas of Cochabamba (BM 34.9.2.180, 181, and 182), Ticunhuaya (AM 72567), Palmira (AM 262402, 262403), and Santa Rosa (AM 262404).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped (fig. 495).

No information is available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Marmosops noctivagus keaysi (Allen), 1900

Marmosa noctivaga keaysi: Cabrera, 1958: 21 (first application of name to Bolivian specimens). Anderson, 1985b: 6 (name in list).

Marmosops noctivagus: Emmons, 1991: 72 (Alto río Madidi and 13 km W of Ixiamas).

Marmosops noctivaga keaysi: Anderson, 1993: 19 (general distributional records).

Marmosa (Marmosops) noctivaga keaysi: Anderson et al., 1993: 17 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (17) AND SPECIMENS (45): **Beni:** 1503/6658, 1 km E Embocada, 2 UMMZ. **Chuquisaca:** 1933/6408, río Limón, 1 CBF. **Cochabamba:** 1620/6645, Yungas, 3 BM (not seen); 1702/6559, 9.5 km by road NE of Tablas Monte, 6 AM, 3 CBF, 3 MSB; 1704/6601, 4.4 km by road N of Tablas Monte, 2 AM, 1 CBF, 2 MSB. **La Paz:** 1335/6846, Moira Camp, Alto río Madidi, 2 CBF, 1 USNM; 1353/6815, 13 km W of Ixiamas, 1 USNM; 1515/6810, Mapiri, 1 BM; 1528/6818, Ticunhuaya, 1 AM; 1529/6731, 1 mi W [= 1.6 km] of Puerto Linares, 1 TTU; 1609/6744, Chijchipa, 1224 m, 3 AM; 1609/6745, Chijchipa, 1114 m, 3 MSB. **Pando:** 1128/6750, 15 km NO de [= NW of] Puerto Camacho, 1 CBF; 1142/6756, Palmira, 2 AM; 1213/6824, Santa Rosa, 1 AM; 1216/6827, 8 km SO de [= SW of] Santa Rosa, 2 CBF. **Santa Cruz:** 1438/6237, Perseverencia, 3 MNK.

Marmosops parvidens Tate, 1931

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Marmosops parvidens* was described by Tate (1931b: 13), type locality "Hyde Park, 30 miles up the Demerara River" in Guyana. Further revisionary work will probably divide the species and a different name will then be needed for the Bolivian specimen.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Size small, dorsum dark brownish. Measurements in tables 2 and 3 are of AM 268938.

DISTRIBUTIONAL NOTES: Bolivia was mentioned beneath a table of measurements in an account of *Marmosa parvidens* (Eisenberg, 1989: 39). However, at that time there was no specific Bolivian record (Eisenberg, in litt.). In 1992, a specimen was trapped at the locality noted below. There is no map.

No information is available on habitat, habits, behavior, food, or reproduction.

LOCALITIES (1) AND SPECIMENS (1): **La Paz:** 1544/6703, La Reserva, 240 m, 1 AM (268938).

Marmosops, species not determined

LOCALITIES (4) AND SPECIMENS (6): **La Paz:** 1534/6716, Palos Blancos, 1 IE; 1544/6731, La Reserva, 1 CBF. **Santa Cruz:** 1811/6344, 1 km NE Estancia Cueva, 1 AM; 1824/6419, 7 km SE Ariruma, 1 AM, 1 MNK, 1 MSB.

Genus *Metachirus* Burmeister, 1854

Placed in a subfamily Metachirinae by Hershkovitz (1992a).

Metachirus nudicaudatus (Desmarest, 1817)

Brown Four-eyed Opossum and Cuica Cola de Rata

TAXONOMIC REMARKS: É. Geoffroy Saint-Hilaire (1803) has been cited commonly as the author of *Didelphis nudicaudata*, but that work was regarded as "not actually published" by Gardner (*in* Wilson and Reeder, 1993: 20), who cited Desmarest (1817: 424). The type locality is Cayenne, French Guiana.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: The color pattern, including the eye-spots, is similar to that in *Philander*, the pouched four-eyed opossum. *Metachirus* does not have a pouch. The tail of *Metachirus nudicaudatus* is less haired at the base and is relatively longer and more slender than that of *Philander opossum*. The dorsal pelage is browner in *M. nudicaudatus*. Measurements in tables 2 and 3 are of specimens from the Yungas of Cochabamba (AM 38716), 3 km SW of Villa Tunari (AM 244617), río Nareuda (AM 248701), 9 km S of mouth of río Chapare (AM 210417), and Serranía Bellavista (AM 246453).

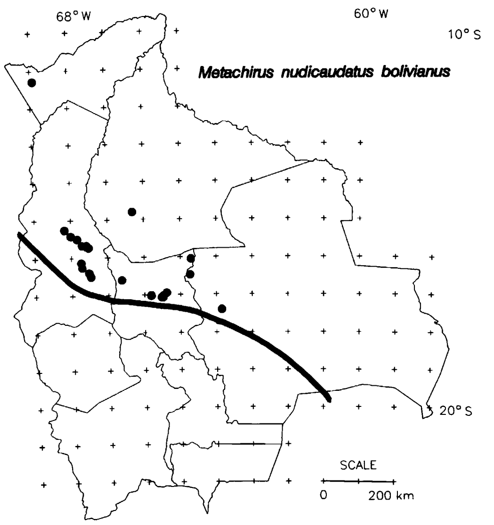


Fig. 496. Localities of known occurrence of *Metachirus nudicaudatus bolivianus*.

Distributional Notes: Known localities are listed below and mapped (fig. 496).

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: Two females taken in July and December had no embryos; no other data available.

Scientific synonyms used for Bolivian specimens are:

Metachirus nudicaudatus bolivianus Allen, 1901

Metachirus nudicaudatus bolivianus Allen, 1901b: 411 (type locality Chulumani, La Paz, Bolivia; on next page used the name *Metachirus bolivianus* by mistake). Thomas, 1902a: 143 (Charuplaya). Neveu-Lemaire and Grandidier, 1911: 19 (same two localities). Anderson, 1985b: 6 (name in list). Anderson, 1993: 19 (general distributional records). Anderson et al., 1993: 18 (vicinity of Santa Cruz de la Sierra).

Metachirus nudicaudatus: Emmons, 1991: 72 (seen at Alto río Madidi in La Paz department).

Localities (22) and Specimens (45): **Beni:** 1448/6618, 2 km E of El Trapiche, 1 IE, 1 MNLP. **Cochabamba:** 1636/6637, Charuplaya, 1 BM; 1657/6523, 2 km E of Villa Tunari, 1 AM; 1700/6550, Yungas, 1 AM; 1702/6529, 3 km SW of Villa Tunari, 1 AM; 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 1 MSB; 1704/6531, San Rafael, 19 km SW of Villa Tunari, 1 UMMZ. **La Paz:** 1515/6810, Mapiri, 2 AM; 1525/6800, río Chimate, 1 AM; 1530/6750, 5 km SE Guanay on río Challana, 1 UMMZ; 1540/6735, Serranía Bellavista, 35 km N of Caranavi, 1 AM; 1540/6742, 4 km NW of Alcoche, 1 UMMZ; 1542/6735, 20 km NNE of Caranavi, 2 UMMZ; 1544/6731, La Reserva, 840 m, 3 AM, 1 CBF, 2 MSB; 1608/6744, Chijchipani, 3 AM; 1614/6745, Yolosito, 3 AM; 1624/6731, Chulumani, 2 AM, 9 BM, 1 US; 1630/6728, 2 km S of Irupana, 1 AM. **Pando:** 1117/6855, río Nareuda, 1 AM. **Santa Cruz:** 1603/6442, río Ichilo, 9 km S of mouth of río Chapare, 1 AM; 1628/6444, río Ichilo, 52 km S of mouth of río Chapare, 1 AM; 1724/6351, río Surutú, 1 CM.

Genus *Micoureus* Lesson, 1842

Micoureus constantiae (Thomas), 1904

This species has no unique vernacular name. Scientific synonyms are given under subspecies below.

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Marmosa constantiae* was described by Thomas (1904a: 243), type locality "Chapada," Mato Grosso, Brazil. Gardner (*in* Wilson and Reeder, 1993: 20) regarded *Didelphis cinerea* Temminck, 1824, as conspecific with *Micoureus demerarae* and preoccupied by *D. cinerea* Goldfuss, 1812; *constantiae* was regarded as a separate species. *Marmosa budini* was described by Thomas (1920a: 195), type locality Altura de Yuto, río San Francisco, Jujuy, Argentina. Tate (1933: 75) first used the name combination *Marmosa constantiae constantiae*. Geographic variation needs to be reexamined to see whether characters are consistent enough to warrant continued recognition of two subspecies in eastern Bolivia.

Morphological Characters and Comparisons: *Micoureus constantiae budini* has been said to differ from *M. c. constantiae* in being smaller and in having a relatively longer tail and smaller teeth (Tate, 1933).

Distributional Notes: Known localities are listed below and mapped (fig. 497).

No information for Bolivia is available on habitat, habits, behavior, or food.

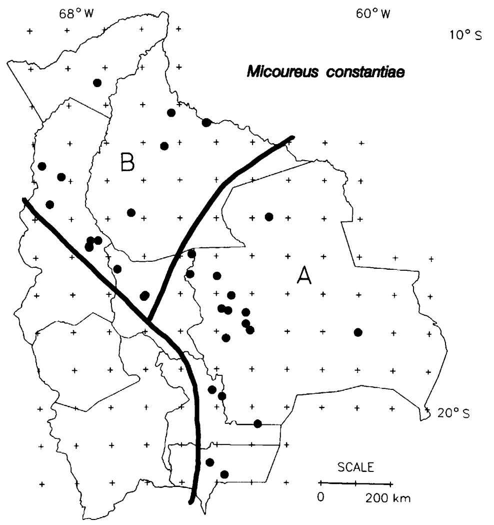


Fig. 497. Localities of known occurrence of *Micoureus constantiae* and its Bolivian subspecies, *M. c. budini* (A) and *M. c. constantiae* (B).

PARASITOLOGY: Brennan (1970: 810) reported the chigger, *Eutrombicula alfreddugesi*, from opposite Costa Marques (1229/6417).

REPRODUCTION: Data on six females are available; four had no embryos in July, August, and September; one was lactating in May; and one had five young in August.

Micoureus constantiae budini (Thomas), 1919

Didelphys cinerea: Thomas, 1888b: 343 (two from "Bolivia" and one from Santa Cruz de la Sierra).

Marmosa constantiae: Vieira, 1955: 351 (Santa Cruz).

Marmosa constantiae constantiae: Tate, 1933: 75 ("Bolivia," Santa Cruz, and Buenavista).

Marmosa constantiae budini: Tate, 1933: 76 (restricted to type locality). Cabrera, 1958: 14 (western Santa Cruz department). Anderson, 1985b: 6 (name in list).

Marmosa constantiae: Krumbiegel, 1941b (Buenavista, Santa Cruz, Cerro Hosana, San José).

Micoureus cinerea budini: Anderson, 1993: 19 (general distributional records).

Marmosa (*Micoureus*) *cinerea budini*: Anderson et al., 1993: 17 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (37) AND SPECIMENS (102): **Chuquisaca:** 1933/6408, río Limón, 1 MSB; 1943/6351, 2 km E of Chuyayacu, 1 MSB. **Santa Cruz:** 1458/6232, Pajaral, 1 MNK; 1557/6441, río Mamoré, 2 km N of mouth of río Chapare, 2 AM; 1629/6444, río Ichilo, 54 km S of mouth of río Chapare, 1 AM; 1632/6359, Yapacaní, 2 BM; 1703/6335, 7 km N of Santa Rosa, 1 IML; 1724/6346, approximately 25 km by road W of Buena Vista, on W bank of río Yapacaní, 2 UM; 1724/6351, río Surutu, 1 CM; coordinates unknown, Cerro Hosana, 4 CM; 1727/6340, Buenavista, 8 BM, 17 CM, 1 FM; 1730/6310, Warnes, 1 US; 1748/6310, Santa Cruz de la Sierra, 1 BM (Thomas, 1888b), 11 CM; 1758/6303, 27 km SE of Santa Cruz, 1 MSB; 1800/6000, Chiquitos, 1 CM; 1811/6344, 1 km NE Estancia Cuevas, 1 MSB; coordinates unknown, 0.5 km E of Terebinto, 1 MNK; 2027/6250, 53 km E of Boyuibe, 1 AM. **Tarija:** 2129/6412, 5 km NNW of Entre Ríos, 1 CBF; 2148/6347, 3 km WNW of Caraparí, 1 AM.

Measurements in tables 2 and 3 are of specimens from Warnes (US 390573) and Cerro Hosana (CM 4941, 4947, 4951).

Micoureus constantiae constantiae (Thomas), 1904

Marmosa constantiae: Brennan, 1970: 810 (chiggers, 1229/6417).

Marmosa constantiae constantiae: Anderson, 1985b: 6 (name in list).

Micoureus cinereus: Emmons, 1991: 72 (Alto río Madidi, 13 km W of Ixiamas, and río Machariapo).

Micoureus cinerea constantiae: Anderson, 1993: 19 (general distributional records).

LOCALITIES (18) AND SPECIMENS (40): **Beni:** 1213/6513, Cascajal, across river from, 1 AM; 1229/6415, río Iténez, 4 km above Costa Marques [Brasil], 1 AM; 1229/6417, río Iténez opposite Costa Marques, 5 AM; 1306/6525, Villa Monte, 1 US; 1451/6621, 5 km N of El Porvenir, 1 MNLP. **Cochabamba:** 1620/6645, Yungas, 2 BM, 1 CM; 1702/6559, 9.4 km by road N of Tablas Monte, 1 AM, 2 CBF, 1 MSB; 1704/6601, 4.4 km by road N of Tablas Monte, 1 AM, 1 MSB. **La Paz:** 1335/6846, Campamento Moira, Alto Madidi, 1 IE; 1353/6815, 13 km W of Ixiamas (Emmons, 1991); 1436/6835, río Machariapo (Emmons, 1991); 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 1

TTU; 1534/6716, Palos Blancos, 1 IE; 1543/6731, La Reserva, 950 m, 1 AM; 1544/6731, La Reserva, 840 m, 3 AM, 3 CBF, 3 MSB; 1545/6731, 1 km S La Reserva, 1 CBF. **Pando:** 1124/6713, La Cruz, 1 MSB. **Department unknown:** coordinates unknown, Bolivia, location uncertain, 4 BM, 1 FM.

Measurements in tables 2 and 3 are of specimens from the río Iténez, opposite Costa Marques (AM 209158–209162), and the Yungas of Cochabamba (BM 34.9.2.183).

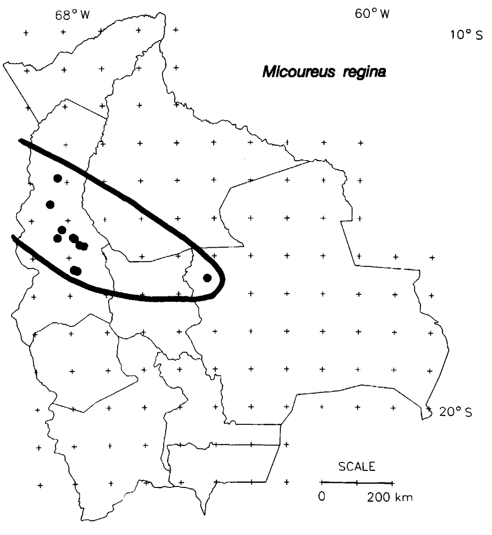


Fig. 498. Localities of known occurrence of *Micoureus regina.*

Micoureus regina (Thomas), 1898

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Marmosa regina* was described by Thomas (1898c: 274), type locality "W. [West] Cundinamarca (Bogotá Region)." *Marmosa rapposa* Thomas, 1899: 42 (type locality "Vilcanota River, just north of Cuzco, Peru") was said by Tate (1933) to be recognizeable by short fur-bearing part of tail; particolored tail; long, rather frizzy and suberect pelage with clear yellow underparts. *M. rapposa* resembles *M. cinerea* and *M. mapiriensis*. Tate gave the range as "southeastern Peru and northeastern Bolivia" but none of the 10 specimens listed was from Bolivia. Pine and Collins (1973) listed this species for Bolivia, but did not indicate the basis for the listing. Perhaps they referred to Tate's undocumented mention of "northeastern Bolivia." *Marmosa rapposa* was treated as a synonym of *Micoureus regina* by Gardner (*in* Wilson and Reeder, 1993).

Morphological Characters and Comparisons: Measurements in tables 2 and 3 are of specimens from Ticunhuaya (AM 72555, holotype), 20 km NNE of Caranavi (UM 126676), and 4 km NW of Alcoche (UM 126679).

Distributional Notes: Known localities are listed below and mapped (fig. 498).

No information for Bolivia is available on habitat, habits, behavior, or food.

Reproduction: No data.

Scientific synonyms used for Bolivian specimens are:

Marmosa mapiriensis Tate, 1931b: 3 (type locality "Ticunhuaya, road from Sorata to Guanay, Tipuani River, Provincia de la Paz, Bolivia, 4800 feet"). Anderson, 1985b: 6 (name in list).

Marmosa mapirensis: Corbet and Hill, 1991: 10 (variant spelling in list).

Micoureus regina: Gardner *in* Wilson and Reeder, 1993: 20 (treated *mapiriensis* and *rapposa* as synonyms of *regina*). Lawrence, 1993: 10 (Ticunhuaya).

Localities (11) and Specimens (13): **La Paz:** 1353/6815, 13 km SW of Ixiamas, 1 USNM; 1434/6828, 17 km N of Apolo, 1 USNM; 1515/6810, Mapiri, 1 AM; 1528/6752, Guanay, 1 AM; 1528/6818, Ticunhuaya, 1 AM; 1530/6750, 5 km SE of Guanay, on río Challana, 1 UMMZ; 1540/6742, 4 km NW of Alcoche, 1 UMMZ; 1542/6735, 20 km NNE of Caranavi, 3 UMMZ; 1619/6752, Ñequejahuira, 1 AM; 1621/6747, Pitiguaya, 1 AM. **Santa Cruz:** 1635/6412, Punta Rieles, 1 AM.

Genus *Monodelphis* Burnett, 1830

These are small opossums with short legs and short tails. They are terrestrial and predaceous so that the species are ecologically comparable to shrews (Soricidae) of similar sizes. At least four and perhaps as many as six species inhabit Bolivia. A critical revision of the genus is needed. One specimen recorded here as "species A" may be of a new species. On one hand, it is conceivable that study of more specimens in greater detail might reveal intergradation between *Mono-*

delphis adusta of Peru and northward, *M. osgoodi*, and *M. kunsi*. On the other hand, it is also conceivable that these are all distinct species and that other unrecognized species remain to be discovered and named in the region. These are nothing more than hypotheses for later testing. *Monodelphis* was placed in a subfamily, Monodelphinae, by Hershkovitz (1992a).

Monodelphis adusta (Thomas), 1897

Taxonomic Remarks: *Peramys adustus* was described by Thomas (1897b: 219), type locality "W. Cundinamarca," Colombia. Cabrera and Yepes (1940: 33) used the name *Monodelphis adusta*. R. H. Pine (in litt., 13 Dec. 1994) wrote that one of the two specimens (AM 264562, from La Reserva) is a *Monodelphis adusta*; the other probably is also.

Monodelphis adusta was reported earlier from the Manu Reserve in Peru, from 825 to 1450 m altitude (Pacheco et al., 1993: 5), but this is the first report for the species from Bolivia.

A synonym applied to the Bolivian specimens is:

Monodelphis kunsi: Salazar Bravo et al., 1994: 127 (specimens from La Reserva).

Localities (1) and Specimens (2): **La Paz:** 1544/6731, La Reserva, 840 m, 1 AM (264562), 1 MSB (68336).

Monodelphis brevicaudata (Erxleben), 1777

Taxonomic Remarks: Type localities of some names used for Bolivian specimens lie outside of Bolivia. *Didelphis brevicaudatus* was described by Erxleben (1777: 80); type locality "In Americae australis silvis," restricted to Surinam by Matschie, 1916. Pelzeln (1883: 117) reported *Didelphis glirina* from Cachoeira do Pau Grande on the río Mamoré, but whether it was from the Brazilian or Bolivian side of the river is unknown. Cabrera (1958: 7) placed *Didelphis glirina* (Wagner, 1842b) in synonymy with *Monodelphis brevicaudata brevicaudata*. If Pelzeln's specimen came from Bolivia, if it is conspecific with Wagner's *glirina*, and if *glirina* is conspecific with *M. brevicaudata*, then *M. glirina* as used by Pelzeln would belong in the synonymy below. Tate (1939: 166) used the name *Monodelphis brevicaudata brevicaudata*.

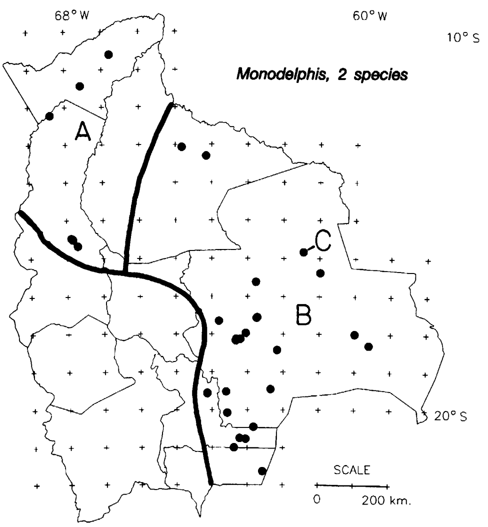


Fig. 499. Localities of known occurrence of two species of *Monodelphis*, *M. brevicaudata* (A) and *Monodelphis domestica* (B), and one specimen (C) similar to *M. domestica*, but smaller and perhaps of a new taxon.

Morphological Characters and Comparisons: The middorsal area is dark gray; the sides of face and body are reddish; and the venter is ochraceous. Measurements in tables 2 and 3 are of specimens from 4 km NW of Alcoche (UM 126682 and 126683) and 5 km SE of Guanay (UM 126684) in La Paz.

Distributional Notes: Taken in riparian habitats in the Amazon basin. Known localities are listed below and mapped (fig. 499).

No information for Bolivia is available on habitat, habits, behavior, or food.

Reproduction: One female had no embryos in August; otherwise no data are available.

Scientific synonym used for Bolivian specimens is:

Monodelphis brevicaudata: Anderson, 1985b: 5 (name in list). Emmons and Smith, 1992 (Centro Dieciocho). Anderson, 1993: 18 (general distributional records).

Localities (6) and Specimens (12): **La Paz:** 1528/6752, Guanay, 1 AM; 1530/6750, 5 km SE of Guanay on río Challana, 2

UMMZ; 1540/6742, 4 km NW of Alcoche, 4 UMMZ. **Pando:** 1036/6647, Centro Dieciocho, 1 CBF (Emmons and Smith, 1992); 1126/6734, Independencia, 1 AM; 1213/6824, Santa Rosa, 2 AM, 1 MSB.

Monodelphis domestica
(Wagner), 1842

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Didelphys domestica* was described by Wagner (1842b: 359); type locality "Cuyaba" = Cuiaba in Mato Grosso, Brazil. Matschie (1916: 271) first used the name combination *Monodelphis domestica.*

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Color generally a drab gray, no distinctive markings. Measurements in tables 2 and 3 are from specimens from río Quiser (CM 5010), Tita (AM 260024), near Santiago de Chiquitos (MSB 55072), and Porvenir.

DISTRIBUTIONAL NOTES: They are widely distributed in the lowlands from Beni southward. Known localities are listed below and mapped (fig. 499).

No information for Bolivia is available on habitat, habits, food, or behavior.

PARASITES: Cestodes of the species *Linstowia schmidti* were reported from Bolivian *Monodelphis domestica* by Gardner and Campbell (1992a: 599). The symbiotype is cited by catalog number in the synonymy below (see Frey at al., 1992 for discussion of symbiotypes). Some biogeographical factors were discussed in another paper (Gardner and Campbell, 1992b: 797).

REPRODUCTION: One young individual was taken in December; otherwise no data are available.

Scientific synonym used for Bolivian specimens is:

Monodelphis domestica: Pine, 1979: 497 (San Joaquín, La Granja, San Ignacio de Velasco, Basilio, 3.4 km S of Basilio, and Tihumayo). Anderson, 1985b: 5 (name in list). Emmons and Feer, 1990: 29 (mentioned Bolivia). Gardner and Campbell, 1992b: 797 (cestode from AM 261244 from Porvenir). Anderson, 1993: 18 (general distributional records). Anderson et al., 1993: 16 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (25) AND SPECIMENS (85): **Beni:** 1304/6449, San Joaquín, 3 FM, 4 US; 1318/6409, La Granja, 4 km N of Magdalena, 1 US. **Chuquisaca:** 1933/6408, Río Limón, 1300 m, 1 AM, 1 MNLP, 1 MSB; 1934/6408, Tihumayu, Tomina Province, 1 US; 2045/6313, Porvenir, 14 AM, 8 MSB; 2046/6303, 3.8 km by road E of Carandayti, 1 MSB. **Santa Cruz:** 1623/6059, San Ignacio de Velasco, 12 US, not examined; 1637/6246, río Quiser, 5 CM; 1733/6244, 8 km N and 1 km E of Pailón, 1 MNK; 1734/6245, 7 km N of Pailón, 2 MNK; 1739/6348, hunting camp at 4 km S, 13 km W San Rafael de Amboró, 1 AM; 1758/6303, 27 km S of Santa Cruz, 2 AM, 2 MSB; 1800/6000, Chiquitos, 1 CM; 1808/6312, 7 km E and 3 km N of Ingeniero Mora, 1 AM; 1808/6319, Basilio, 1 US; 1810/6320, 3.4 km S of Basilio, 2 US; 1818/5936, 4 km N and 1 km W of Santiago de Chiquitos, 1 MSB; 1825/6210, Tita, 1 AM; 1927/6221, Cerro Colorado, 5 EBD; 1931/6336, 1 km S and 3 km W of Estancia Isibobo, 1 MNK; 2005/6334, near Camiri, 1 CAS; 2027/6250, 53 km E of Boyuibe, 1 AM; coordinates unknown, Cafeces, Monte Grande, 2 CM, 1 FM. **Tarija:** 2100/6323, 1 km S of Camatindi, 1 AM, 1 CBF; 2138/6234, Estancia Bolivar, 2 AM. **Department unknown:** coordinates unknown, "Bolivia" only, 3 US.

Monodelphis emiliae (Thomas), 1912

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Peramys emiliae* was described by Thomas (1912e: 89); type locality "Boim, R[io]. Tapajos;" on the west bank and in the state of Pará, Brazil, according to Cabrera (1958: 9). Cabrera used the name *Monodelphis touan emiliae*. Peterson and Pine (1982: 467) recognized *Monodelphis emiliae* as a distinct species again and this evaluation was documented by Pine and Handley (1984).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "The tail of *Monodelphis emiliae* is furred throughout its length" (Pine and Handley, 1984: 241). Measurements in tables 2 and 3 are of specimens from Bolivia (LHE 837), from Vila Braga, Brazil (BM 20.7.14.44), and from Quebrada Aucayo, Peru (FM 58955; data on the latter two are

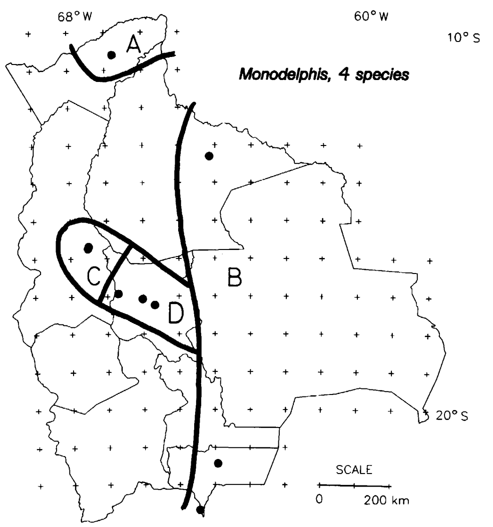


Fig. 500. Localities of known occurrence of four species of *Monodelphis*, *M. emiliae* (A), *M. kunsi* (B), *M. adusta* (C), and *M. osgoodi* (D).

from Pine and Handley (1984: 241); I have seen neither these specimens nor the ones from Bolivia.

Distributional Notes: Its presence in northern Bolivia was only recently discovered. Known localities are listed below and mapped (fig. 500).

No detailed information is available on habitat, habits, behavior, food, or reproduction in Bolivia.

Scientific synonym used for Bolivian specimens is:

Monodelphis emiliae: Emmons and Smith, 1992 (Centro Dieciocho).

Localities (1) and Specimens (1): **Pando:** 1036/6647, Centro Dieciocho, 1 US (Emmons and Smith, 1992).

Monodelphis kunsi Pine, 1975

Morphological Characters and Comparisons: Measurements in tables 2 and 3 are of specimens from the type locality (US 461348), río Lipeo (ANSP 18191), and Tapecua (AM 263968).

Distributional Notes: Known localities are listed below and mapped (fig. 500). Formerly known as a Bolivian endemic but recently reported without documentation from Brazil (Gardner *in* Wilson and Reeder, 1993: 21).

Habitat: The habitat at Tapecua was described as "a ravine on a southwest-facing slope with dense shrubs. The trapsite had many rocks and much fallen wood, and the ground had 10 or 12 cm of leaf mulch and litter on the surface. The slope at this specific point was about 30° and less than 5% of the ground cover was composed of small forbs and ferns" (Salazar et al., 1994: 127).

No information is available on habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Monodelphis (*Monodelphis*) *kunsi* Pine, 1975: 321 (type locality "La Granja, W bank of río Itonamas, 4 km N Magdalena"). Anderson, 1982: 1; 1985b: 5 (name in list).

Monodelphis kunsi: Emmons and Feer, 1990: 28 (mapped in Bolivia). Anderson, 1993: 18 (general distributional records). Salazar et al., 1994: 127 (a specimen from Tapecua).

Localities (3) and Specimens (3): **Beni:** 1318/6409, the holotype, US. **Tarija:** 2126/6355, Tapecua, 1 AM; 2241/6426, río Lipeo, 1 ANSP.

Monodelphis osgoodi Doutt, 1938

Morphological Characters and Comparisons: Measurements in tables 2 and 3 are of specimens from Incachaca (CM 5242, 5248), Choro (FM 74861), and 4.4 km N of Tablas Monte (AM 264922).

Distributional Notes: Known localities are listed below and mapped (fig. 500).

Habitat: The habitat at La Reserva was described as "a banana field some 30 m from the river on the moderately disturbed terrace. The canopy began at 7 or 8 m and provided 20 to 50% cover. Shrubs formed about 10% of the cover and the area was almost flat. The soil was very moist, with high organic content and at least 2 cm of leaf litter" (Salazar et al., 1994: 127).

No information is available on habits, behavior, or food:

Reproduction: One female taken in July had no embryos; otherwise no data are available.

Scientific synonyms used for Bolivian specimens are:

Monodelphis peruvianus osgoodi Doutt, 1938: 100 (type locality "Incachaca" in department of Cochabamba, Bolivia).
Monodelphis adusta osgoodi: Cabrera, 1958: 6.
Monodelphis osgoodi: Pine, in litt., 1994. Anderson, 1985b: 5 (name in list). Anderson, 1993: 18 (general distributional records).
Monodelphis kunsi: Salazar et al., 1994: 127 (specimens from La Reserva).

LOCALITIES (3) AND SPECIMENS (4): **Cochabamba:** 1656/6642, Choro in province of Ayopaca, 1 FM; 1704/6601, 4.4 km by road N of Tablas Monte, 1 AM [AM 264922]; 1714/6541, Incachaca, 2 CM.

Monodelphis sp. A

TAXONOMIC REMARKS: One specimen is too large for *adusta*, *kunsi*, or *osgoodi* and too small for *emiliae*, *domestica*, or *brevicaudata*. In color, it resembles *domestica*, but it is much smaller than other known *M. domestica*. Other characters have not been ascertained. This may be of an undescribed species, but in the absence of a comprehensive recent revision of the genus (or of time to make such revision myself) the taxonomic status remains unresolved.

LOCALITIES (1) AND SPECIMENS (1): **Santa Cruz:** 1550/6127, Santa Rosa de la Roca, 1 (AM 263548, NK 21048).

Measurements in tables 2 and 3 are of the specimen noted.

Monodelphis, species not determined

Chuquisaca: 2058/6251, 30 km SE of Carandaity, 1 LACM. **Pando:** 1117/6855, río Nareuda, 1 AM (fragment from ocelot stomach).

Genus *Philander* Tiedemann, 1808

Taxonomic Notes: *Philander* was placed with *Didelphis*, *Chironectes*, and *Lutreolina* in the Subfamily Didelphinae, Family Didelphidae, Superfamily Didelphoidea, and Order Didelphoidia by Hershkovitz (1992a). The generic name for this species of gray-pouched, four-eyed opossum has a complex and controversial nomenclatural history (see relevant discussions by Allen, 1900b; Gardner, 1981; Hershkovitz, 1981; Husson, 1978; Pine, 1973b). The use here of *Philander* Tiedemann, 1808, is based on the following interpretations: Tiedemann's *Philander virginianus* is the type species of his genus *Philander*. *Philander virginianus* Tiedemann, 1808, is a renaming of *Didelphis opossum* Linnaeus, 1758. In the interests of nomenclatural stability, it is best to regard *D. opossum* Linnaeus, 1758, as being the gray four-eyed opossum here under consideration.

Philander opossum (Linnaeus), 1758

Four-eyed Opossum

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Didelphis opossum* was described by Linnaeus (1758: 55); type locality "America," restricted by Allen (1900c: 195) to "Surinam," and further restricted by Matschie (1916: 268) to "Paramaribo."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: This large "four-eyed" opossum is slightly smaller than the species of *Didelphis* and has shorter fur that is dark gray above, yellowish white below, and with a darker mid dorsal stripe. The pouch is complete, as in *Didelphis*. The name "four-eyed" refers to the pair of buff-colored spots in dark background just above the eyes. Similar markings appear in *Metachirus nudicaudatus*, which differs from *Philander opossum* in lacking hair on the basal part of the tail and in lacking a pouch. In *P. opossum*, hair occurs on about 50 to 75 mm of the tail at its base and the supraorbital processes of the skull are pronounced. *Philander opossum crucialis* was characterized (Thomas, 1926c) as a pale gray form without median dorsal line that was "most nearly allied to the Paraguayan form" (*P. o. azaricus*) but differed from it in grayer color, larger supraocular patches with unusually narrow division between them, whiter venter, and shorter white tail tip. Measurements in tables 2 and 3 are of specimens from Puerto Caballo (AM 210411, a large male, and 210412, a smaller male).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped (fig. 501).

No data for Bolivia are available on habitat, habits, behavior, or food.

PARASITOLOGY: Yunker and Brennan (1964) reported a chigger, *Euschoengastia kunsi*, from San Joaquín. Brennan (1970: 810) reported three species of chiggers, *Eu-*

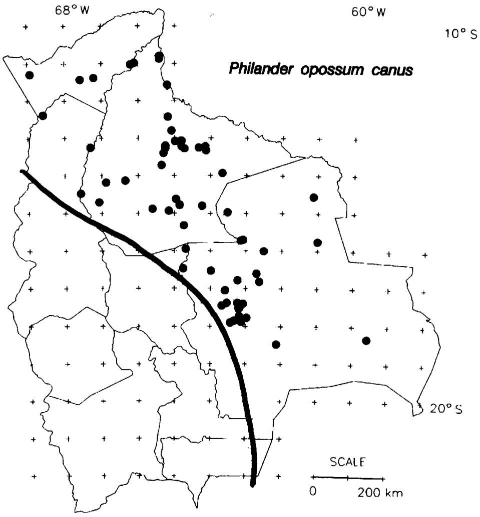


Fig. 501. Localities of known occurrence of *Philander opossum canus.*

trombicula alfreddugesi from Guayaramerin and from Nicolas Suárez Island, *E. goeldii* from Guayaramerin, and *Trombicula dunni* from Nicolas Suárez Island.

REPRODUCTION: Data on five females are available; two had no embryos; three had young in pouches (4, 5, and 7) in September and October. Many "young" individuals are recorded, but precise estimates of age have not been attempted.

Scientific synonyms used for Bolivian specimens are:

Philander opossum canus
(Osgood), 1913

Philander quica: Gerrard, 1862: 139 (one skull, Santa Cruz, presumably of this species).

Didelphys opossum: Thomas, 1888b: 332 (Santa Cruz de la Sierra).

Metachirus canus Osgood, 1913: 96 (type locality Moyobamba, San Martin, Peru).

Metachirus opossum crucialis Thomas, 1923: 604 (type locality Santa Cruz de la Sierra, Bolivia).

Metachirus opossum canus: Thomas, 1926d: 194 (*crucialis* and *canus* synonymized, Buenavista mentioned).

Philander opossum: Yunker and Brennan, 1964: 193 (chigger, San Joaquin). Brennan, 1970: 810 (chiggers, 1048/6525, 1049/6525). Cabot et al., 1986: 42 (name in list).

Metachirops opossum canus: Anderson, 1985b: 6 (name in list).

Philander opossum canus: Anderson, 1993: 19 (general distributional records). Anderson et al., 1993: 18 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (71) AND SPECIMENS (186): **Beni:** 1048/6525, Nicolas Suárez Island in río Mamoré near Guayaramerin, 1 AM; 1049/6525, Guayaramerin, 2 AM; 1052/6525, 5 km S of Guayaramerin, 1 AM; 1059/6606, Riberalta, 4 US; 1134/6512, 6 km S of Buena Hora, 1 AM; 1226/6511, río Mamore, 1 AM; 1248/6505, Puerto Siles, 2 AM; 1304/6448, Camino Vilches, 1 US; 1304/6449, San Joaquín, 13 FM; 1305/6459, San Pablo, 1 FM; 1312/6515, 8 km N Exaltación, 1 AM; 1313/6409, Boroica, 1 US; 1313/6448, Barranquita, 1 FM; 1315/6420, Piedras Blancas, 6 MNK; 1316/6515, Exaltación, 1 FM; 1317/6443, San Ramón, 1 FM, 2 MSB; 1320/6408, Magdalena, 5 FM; 1324/6518, 4 km SE Palacios, 1 AM; 1343/6521, Puerto Caballo, 2 AM; 1356/6340, El Carmen, 1 FM; 1408/6621, Espíritu, 3 IE; 1411/6653, Santa Rosa, 1 FM; 1428/6734, Rurrenabaque, 1 AM; 1437/6457, mouth of río Ibare, 3 AM; 1442/6704, 45 km N of Yacuma, 1 AM; 1446/6451, río Ibare, 24 km from mouth, 1 AM; 1447/6451, río Ibare, 27 km from mouth, 1 AM; 1448/6414, Casarabe, 4 AM, 1 MSB; 1453/6536, San Ignacio de Moxos, 6 US; 1456/6509, río Tijamuchi, 1 AM, 1 MSB; 1519/6444, Camiaco, 1 AM; coordinates unknown, probably from the Alto Beni, 1 MSB; coordinates unknown, Arruda, 1 FM; coordinates unknown, Centenela, 2 FM; coordinates unknown, Mamoré, 2 FM; coordinates unknown, Santo Dios, 1 FM. **Cochabamba:** 1628/6445, río Ichilo, 52 km S of mouth of río Chapare, 1 AM. **La Paz:** 1315/6718, río Beni, 1 MSB. **Pando:** 1101/6612, Agua Dulce, 2 AM; 1117/6855, río Nareuda, 2 AM; 1123/6712, Bella Vista, 2 AM, 1 MSB; 1126/6734, Independencia, 1 AM; 1223/6835, Isla Gargantua, 1 AM, 1 MSB. **Santa Cruz:** 1433/6108, Km 7 E of Aserradero Moira, 1 EBD; 1458/6331, Pajaral, 1 MNK; 1542/6305, Ascención de Guarayos, 2 FM; 1543/6309, 6 km by road W of Ascención, 2 AM, 1 MSB; 1545/6100, Los Palmares, 2 MNK; 1557/6441, río Mamoré, 2 km N of mouth of río Chapare, 1 AM; 1600/6230, Totaitu, 2 MNK; 1632/6359, Yapacaní, 1 BM; 1636/6242, 10 km N of San Ramón, 2 AM, 2 MSB; 1647/6314, Estancia Cachuela Esperanza, 2 AM, 1 MSB; 1649/6237, Palmarito, 3 CM; 1703/6335, 7 km N of Santa Rosa, 1 AM, 1 CM, 8 IML; 1723/6314, 3 km SE Montero, 1 km N of Villa Copacabana, 2 AM, 2 MNK, 2 MSB; 1723/6332, San Miguel Rincón, 3 AM, 2 MSB; 1724/6304, Tocomechi, 1 US; 1727/6340, Buenavista, 1 AM, 8 BM, 1 CM, 3 FM, 2 MACN (not examined); 1730/6310, Warnes, 4 US; 1731/6311, Santa Rosita, 3 km SW of Warnes, 4 US; 1731/6312, 2 km S of La Belgica, 1 MNK; 1744/6311, Hamecas, 1 AM; 1746/6258, 2 km SE of Cotoca, 1 MSB; 1748/6308, El Palmar road, 7 km SE Santa Cruz, 1 US; 1748/6310, Santa Cruz de la Sierra, 1 AM, 2 BM, 4 CM, 1 US; 1751/6309, El Palmar, 10 km SE Santa Cruz, 1 US; 1751/6320, 1 km E of Ayacucho, 1 US; 1753/6307, 15 km S of Santa Cruz, 2 AM, 3 MSB; 1754/6326, 15 km SW of Santa Cruz, 1 US; 1819/5934, Santiago in province of Chiquitos, 1 FM; 1828/6207, 8 km SE of Tita, 2 AM. **Department unknown:** coordinates unknown, perhaps from Bolivia, "Andes S. A.," 1 US.

Genus *Thylamys* Gray, 1843

TAXONOMIC NOTES: Four Bolivian species with tricolored pelage and seasonally fat tails are now placed in the genus *Thylamys*—*Thylamys macrura*, *T. pallidior*, *T. pusillus*, and *T. venustus*. Hershkovitz (1992a) recognized a subfamily Thylamyinae in a family Marmosidae. Cabrera regarded *Marmosa pusilla* as including a subspecies *M. pusilla pallidior*, whereas Tate had included *pallidior* as a species of his *venusta* section; *pallidior* is here regarded as a distinct species.

Thylamys macrurus (Olfers *in* Eschwege, 1818)

TAXONOMIC REMARKS: *Didelphys macrura* was described by Olfers (1818: 205) from "Sudamerica." The type locality was restricted to "Tapua" in Presidente Hayes department, Paraguay, by Gardner (*in* Wilson and Reeder, 1993: 23). The status of Olfers's names was discussed by Hershkovitz (1959a: 338). The specimen (AM 263549) here reported, the first of this species from Bolivia, was identified as *Thylamys macrura* by Darrin Lunde in December 1995. Although I have not personally examined comparative material from Paraguay, I thought this tentative identification should be brought to the reader's attention.

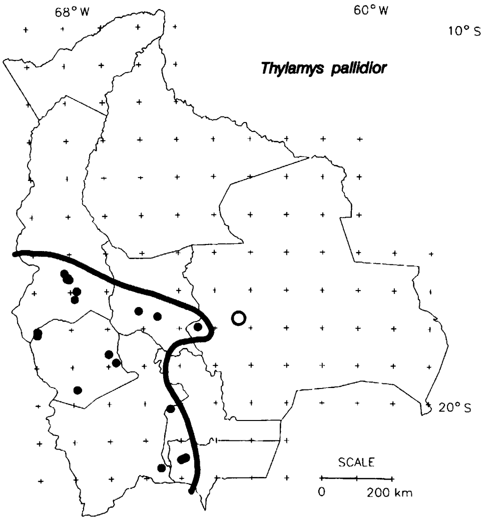


Fig. 502. Localities of known occurrence of *Thylamys macrurus* (circle) and *T. pallidior* (dots).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 2 and 3 are of AM 263549.

DISTRIBUTIONAL NOTES: The only known Bolivian locality is noted below and mapped (fig. 502).

No detailed data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

LOCALITIES (1) AND SPECIMENS (1): Santa Cruz: 1747/6322, 1 AM (263549).

Thylamys pallidior (Thomas), 1902

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 2 and 3 are of specimens from N of Camargo (AM 262405–262406 and MSB 57003) and from Challapata (BM 2.2.2.116 to 121 and US 121157).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped (fig. 502).

No data for Bolivia are available on habitat, habits, behavior, or food.

REPRODUCTION: Data on only two females are available; one taken in July had no embryos; another one in July had four uterine scars indicating earlier pregnancy.

Scientific synonyms used for Bolivian specimens are:

Marmosa elegans: Thomas, 1902b: 230 (from Challapata).

Marmosa elegans pallidior Thomas, 1902e: 161 (type locality "Challapata, Bolivia"). Thomas, 1926d: 195 (from Yuruma).

Marmosa pallidior: Tate, 1933: 229 (Challapata, La Paz, Yuruma).

Marmosa pusilla pallidior: Cabrera, 1958: 32 (first use of name combination). Anderson, 1985b: 6 (name in list).

Thylamys pallidior: Mercado Tudor and Miralles, 1991: 295 (La Paz valley). Gardner *in* Wilson and Reeder, 1993: 23. Anderson, 1993: 19 (general distributional records). Yensen and Tarifa, 1993: 51 (Quebrada Kohuiri and Loma Jincho Asjata = 1803/6856).

Localities (19) and Specimens (48): **Chuquisaca:** 2009/6517, 68 km by road N of Camargo, 3 AM, 1 MSB [57003]. **Cochabamba:** 1732/6607, 1.3 km W of Jamachuma, 1 AM, 2 CBF, 1 MSB; 1741/6536, 7.5 km SE of Rodeo, 2 AM, 2 MSB. **La Paz:** 1630/6809, La Paz, 1 Berlin (Tate, 1933); 1637/6803, Huajchilla, 4 MNLP; 1639/6805, 4 km SW of Huajchilla, 2 IE (not seen); 1640/6801, Mecapaca, 1 IE; 1659/6749, Caracato, 3 AM; 1710/6755, Huaraco, 1 IE. **Oruro:** 1803/6856, 9 km N and 4 km E of Sajama, 1 CBF; 1808/6857, Quebrada Kohuir, 3 CBF; 1840/6659, 10 km by road SW of Pazña, 3 UMMZ; 1854/6647, Challapata, 6 BM, 1 US; 1936/6753, Luca, 1 IE. **Potosí:** 2143/6534, Yuruma, 1 BM. **Santa Cruz:** 1758/6429, 5 km by road SE of Comarapa, 1 AM. **Tarija:** 2127/6452, Serranía Sama, 1 AM; 2129/6457, 1 km E of Iscayachi, río Tomayapo, 1 AM; 2130/6500, 25 km SSE of Camataqui, 1 MVZ.

Thylamys pusillus
(Desmarest), 1804

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Didelphis pusilla* was described by Desmarest (1804: 19); type locality "Saint-Ignace-Gouazou," [Paraguay, restricted to San Ignacio by Tate, 1933].

Morphological Characters and Comparisons: Measurements in tables 2 and 3 are of specimens from 3.8 km E of Carandayti (AM 261268), Santa Cruz de la Sierra (BM 23.12.12.15), and 35 km SE of Villa Montes (UM 156025–156032).

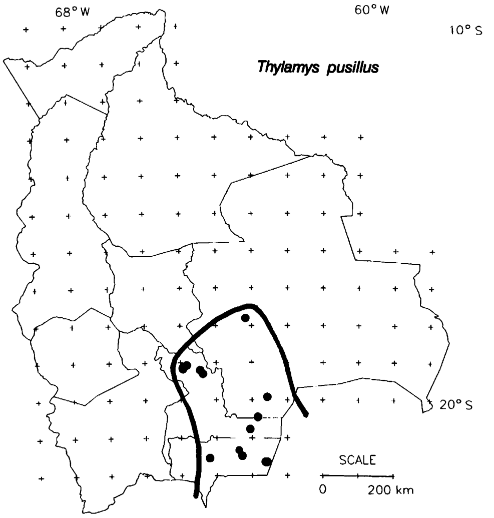


Fig. 503. Localities of known occurrence of *Thylamys pusillus*.

Distributional Notes: Known localities are listed below and mapped (fig. 503).

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Marmosa pallidior: Tate, 1933: 229 (Santa Cruz).

Marmosa pusilla pallidior: Anderson, 1985b: 6 (name in list).

Thylamys pusilla: Corbet and Hill, 1991: 10 (name in list). Gardner *in* Wilson and Reeder, 1993: 23. Anderson, 1993: 19 (general distributional records). Parker et al., 1993: 101 (Perforación).

Marmosa (*Thylamys*) *pusilla pallidior*: Anderson et al., 1993: 18 (vicinity of Santa Cruz de la Sierra).

Localities (14) and Specimens (48): **Chuquisaca:** 1904/6449, 12 km N and 11 km E of Tarabuco, 2 MNLP, 2 MSB; 1908/6456, 4 km N of Tarabuco, 1 AM; 1910/6456, 2 km N of Tarabuco, 1 AM; 1912/6427, 11 km N and 16 km W of Padilla, 5 AM, 2 MNLP; 1918/6422, 9 km by road N of Padilla, 1 AM, 1 MNLP, 2 MSB; 2046/6303, 3.8 km by road E of Carandayti, 1 AM (261258), 1 MSB (55846). **Santa Cruz:** 1748/6310, Santa Cruz de la Sierra, 1 BM; 1955/6234, Puesto Perforación (Parker et al., 1993: 101); 2027/6250, 53 km E of Boyuibe, 1 AM, 1 MNK. **Tarija:** 2119/6325, 8 km S and 10 km E of Villa Montes, E bank of río Pilcomayo, 1 CBF; 2128/6317, 35 km by road SE of Villa Montes, 13 UMMZ; 2132/6412, Entre Ríos 1 US; 2138/6234, Estancia Bolivar, 3 AM, 3 CBF, 3 MSB; 2138/6237, 5 km W of Estancia Bolivar, 1 AM.

Thylamys venustus (Thomas), 1902

TAXONOMIC REMARKS: Tate (1933) distinguished an *elegans* section and a *venusta* section within his *elegans* group, but this distinction has not been accepted. He included in the *elegans* section the Bolivian taxa bearing the names *Marmosa janetta* and *Marmosa pusilla*. Cabrera (1958) included *janetta* in the synonymy of *Marmosa elegans venusta*, but reasons for this assignment were not published. No clear difference between the subspecies *M. e. cinderella* and *M. e. venusta* was given by Tate (1933). The range of the subspecies *M. e. sponsoria* (of Thomas, from Jujuy in northern Argentina) was straddled by specimens assigned (but not correspondingly mapped) by Tate to *cinderella*, and *sponsoria* was subsequently synonymized with *M. e. cinderella* (type locality Tucuman, Argentina) by Cabrera (1958). Palma (1994) has recently shown that *Thylamys elegans* is restricted to Chile and that other populations formerly referred to as *T. elegans*, including those in Bolivia, should be known as *T. venustus*. This pattern, with a species once thought to occupy a large range in southern South America being restricted to Chile and other populations now being referred to by a different species name, has been found also in *Oligoryzomys longicaudatus* (Gallardo and Palma, 1990) and *Phyllotis darwini* (Spotorno and Walker, 1983: 51; Walker et al., 1984: 229).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 2 and 3 are of specimens from 8 km N Cuyambuyo (UM 156033), Cochabamba (CM 5231), Vacas (CM 5296), Vermejo (AM 38996), Carlazo (BM 26.1.1.167 to 170), Parotani (AM 40790), 35 km SE of Villa Montes (UM 155837–155841, 156025–156032).

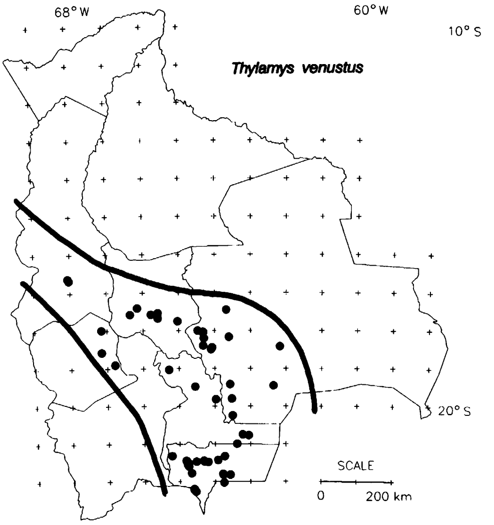


Fig. 504. Localities of known occurrence of *Thylamys venustus*.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped (fig. 504).

No data are available for Bolivia on habitat, habits, food, or behavior.

PARASITES: Cestodes of the genus *Linstowia* were reported from *Thylamys elegans venusta* from near Porvenir by Gardner and Campbell (1992b: 797). A new species, *L. schmidti*, was named; the symbiotype is AM 261257. (A symbiotype is the host specimen associated with a holotype of a parasite; see Frey et al., 1992.) Some biogeographical factors were discussed in another paper (Gardner and Campbell, 1992a: 597).

REPRODUCTION: Four females had no embryos when taken in March, May, September, and October; otherwise no data are available.

Scientific synonyms used for Bolivian specimens are:

Marmosa elegans: Thomas, 1898b: 4. Neveu-Lemaire and Grandidier, 1911: 19 (from three Bolivian localities).

Marmosa elegans venusta Thomas, 1902e: 159 (type locality given on p. 160 as "Paratani, W. of Cochabamba, Bolivia. Altitude 2800 m."). Osgood, 1916: 200. Cabrera, 1958: 30. Anderson, 1985b: 6 (name in list).

Marmosa elegans cinderella Thomas, 1902e) 159 (type locality "Tucuman," Argentina). Cabrera, 1958: 29. Anderson, 1985b: 6 (name in list).

Marmosa venusta venusta: Tate, 1933: 225 (Sucre, Cochabamba, Parotani).

Marmosa janetta Thomas, 1926b: 327 (type locality "Carlazo, 2300 m." in Tarija, Bolivia; also Tablada). Tate, 1933: 220.

Marmosa venusta cinderella: Tate 1933: 227 (Caraparí).

Thylamys elegans venusta: Anderson, 1993: 19 (general distributional records). Gardner and Campbell, 1992b: 797 (*Linstowia schmidti*, new cestode from host symbiotype, AM 261257, from Porvenir). Gardner and Hugot, in press (new genus and species of pinworm, from 1803/6419).

Marmosa (*Thylamys*) *elegans venusta*: Anderson et al., 1993: 17 (vicinity of Santa Cruz de la Sierra).

Thylamys venustus: Palma, 1994 (see note under genus above).

LOCALITIES (52) AND SPECIMENS (181): **Chuquisaca:** 1902/6517, Sucre, 2 BM; 1929/6433, Horcus, 80 km SE Sucre, 1 MVZ; 1933/6408, río Limón, 1 CBF, 1 MSB; 1949/6358, 2 km SW of Monteagudo, 2 AM; 2045/6313, Porvenir, 7 AM, 1 MNLP, 10 MSB; 2046/6303, 3.8 km by road E of Carandayti, 1 AM [261245]. **Cochabamba:** 1724/6609, Cochabamba, 1 BM, 1 CM, 2 FM; 1732/6535, Vacas, 1 CM; 1734/6546, Arani, 1 FM; 1734/6621, Paratani, 4 AM, 4 BM, 2 FM; 1740/6535, 7.5 km SE of Rodeo, 1 MSB [NK 25027]; 1745/6502, 17 km E of Totora, Tinkusiri, 1 AM, 2 MSB. **La Paz:** 1637/6803, Huajchilla, 1 EBD, 4 MNLP; 1640/6801, Mecapaca, 2 EBD. **Oruro:** 1759/6709, Oruro, 1 CM; 1834/6709, 64 km (40 mi) S of Oruro, 1 MVZ; 1854/6647, Challapata, 1 US. **Santa Cruz:** 1727/6340, Buenavista, 1 BM (not seen); 1800/6428, 2.5 km N of Tambo, province of Caballero, 1 AM; 1802/6419, 6 km NNE of Quiñe (Estancia Jahue), 2 AM, 1 CBF, 1 MSB; 1803/6419, 5 km NE of Quiñe, 1 AM, 1 MSB; 1810/6336, Vermejo, 1 AM; 1812/6418, 17 km S of Quiñe (Estancia Laja), 1 MSB; 1824/6419, 7 km by road SE of Ariruma, 2 AM, 1 CBF, 5 MSB; 1825/6210, Tita, 1 AM; 1827/6404, 5.5 km by road NNE of Vallegrande río Cienega), 3 AM, 2 MNK, 3 MSB; 1830/6406, Vallegrande, 2 US; 1925/6334, Gutierrez, 1 US; 1927/6221, Cerro Colorado, 14 EBD; 1948/6331, Cerro Itahuaticua, 1 AM, 1 MSB; 2015/6330, 10 km S of Camiri, 2 US. **Tarija:** 2100/6323, 1 km S of Camatindi, 1 AM, 2 MSB; 2119/6513, 40 km (25 mi) SSE of Camataqui, 1 MVZ; 2120/6344, 2 km S and 5 km E of Palos Blancos, 1 AM; 2126/6355, Tapecua, 1 AM, 1 CBF, 1 MSB; 2127/6419, Rancho Tambo, 61 km by road E of Tarija, 1 AM; 2127/6449, 1 km E of Tucumilla, 2 AM, 1 CBF, 1 MSB; 2128/6418, Pino, 1 BM; 2128/6432, Carlazo, 5 BM, 1 FM; 2128/6448, Erquis, 1 AM; 2129/6412, 5 km NNW of Entre Ríos, 3 AM, 3 CBF, 3 MSB; 2131/6445, Tarija, 2 FM; 2133/6447, Tablada, 4 BM, 1 FM; 2136/6445, 8 km (5 mi) S Tarija, 1 MVZ; 2147/6440, 11.5 km N and 5.5 km E of Padcaya, 1 AM; 2148/6347, 3 km WNW of Caraparí, 2 AM, 3 CBF, 3 MSB; 2149/6334, Caiza, 1 (Thomas, 1898b); 2149/6346, Caraparí, 5 BM; 2202/6345, Yacuiba, 1 BM; 2212/6436, 8 km by road N of Cuyambuyo, 5 UMMZ; 2213/6436, 4 km by road N of Cuyambuyo, 7 UMMZ; 2216/6433, 3 km SE of Cuyambuyo, 7 AM, 2 CBF, 2 MSB.

FAMILY CAENOLESTIDAE TROUESSART, 1898

TAXONOMIC REMARKS: A superfamily Caenolestoidea has been recognized by many authors (e.g., Trouessart, 1898: 1205; Simpson, 1945: 44; Marshall, 1980: 28) and Gardner (*in* Wilson and Reeder, 1993: 25) recognized the order Paucituberculata (Ameghino, 1894: 76), which also includes a number of extinct South American families (see Marshall, 1980: 28, for a summary of the history).

Genus *Lestoros* Oehser, 1934

Lestoros inca (Thomas, 1917)

The vernacular name Peruvian "Shrew" Opossum was used by Nowak and Paradiso (1983: 55).

TAXONOMIC REMARKS: *Orolestes inca* was described by Thomas (1917c: 3). The type locality is "Torontoy, 14,000 feet" in Cuzco, Peru. *Orolestes* was preoccupied and Tate (1934: 154) proposed *Cryptolestes*. Unfortunately, this name was also preoccupied and Oehser (1934: 240) proposed *Lestoros*. The systematics of the living caenolestids was revised by Bublitz (1987: 78) who considered *Lestoros* to be a synonym of *Caenolestes* and named a new species *C. gracilis* with type locality "Limacpunco (13°28′S, 70°55′W) in Perú, 2400 m." Subsequently, Gardner (*in*

Wilson and Reeder, 1993: 25; with no further documentation) considered *C. gracilis* to be a synonym of *Lestoros inca*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 2 and 3 are of the Bolivian specimen (CBF 4000, 1448/6902).

DISTRIBUTIONAL NOTES: The first Bolivian specimen was taken at Llamachaque, 3150 m, near Pelechuco, La Paz department, on 3 June 1995, by Nuria Bernal (personal commun.). No map is provided here.

No data are available for Bolivia on habitat, habits, behavior, parasites, food, or reproduction.

ORDER XENARTHRA COPE, 1889

External dimensions measured for xenarthrans in table 4 are as follows: total length, length of tail vertebrae, length of hind foot, length of ear, and weight (from collectors' field data). Different cranial dimensions were measured for each of the four families.

FAMILY BRADYPODIDAE GRAY, 1821

Cranial measurements of sloths in table 5 are as follows: condylonasal length, basal length, palatal length, zygomatic breadth, interorbital breadth, and postorbital breadth.

Genus *Bradypus* Linnaeus, 1758

One of the three living species occurs in Bolivia.

Bradypus variegatus Schinz, 1823

Three-toed Sloth, Perezoso, Perico Ligero

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Bradypus variegatus* was described by Schinz (1823: 510), type locality Brazil, possibly Bahia.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 4 and 5 are of specimens from 1 km W of the río Piray (MSB 55206), Buenavista (CM 2169, 2179, ANSP 14288, 14289, BM 26.12.4.78 to 79, 34.9.2.195), and Santa Cruz de la Sierra (CM 1987).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 505.

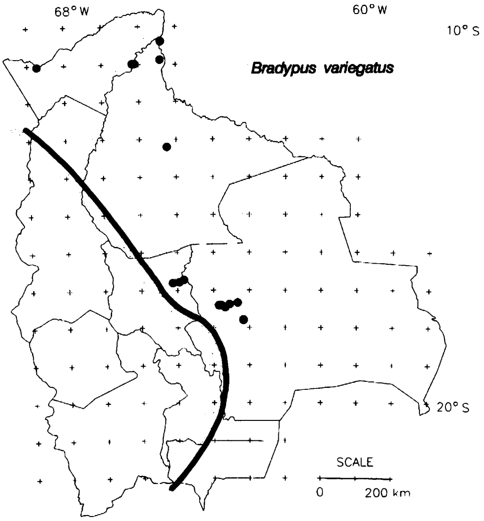


Fig. 505. Localities of known occurrence of *Bradypus variegatus*.

HABITAT: Forests at lower and middle elevations.

No detailed Bolivian data are available on habits, behavior, or food.

REPRODUCTION: One was born in August at the zoo in Santa Cruz. This was an animal free on the zoo grounds, not in a cage. The neonate died during a cold spell and was preserved in alcohol (now at MSB, S. Anderson field number 10383).

CONSERVATION STATUS: Common in many areas. However, listed as "threatened" under CITES Appendix II.

Scientific synonyms used for Bolivian specimens are:

Bradypus variegatus: Wetzel and Avila-Pires, 1980: 833. Wetzel, 1982: 353 (ecology, map). Wetzel, 1985a: 9. Cabot et al., 1986: 42 (undocumented name in list). Cameron et al, 1989: 69 (observations in western Pando). Emmons and Feer, 1990: 36 (mentioned Bolivia). Ergueta and Salazar Bravo, 1991: 20 (general summary). Vargas and Mendez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Anderson, 1993: 29 (general distributional records). Anderson et al., 1993: 34 (vicinity of Santa Cruz de la Sierra).

Arctopithecus gularis: Gerrard, 1862: 291 (one from "Bolivia," in Bridges's collection). Gray, 1850c: plate 11, fig. 6 ("Bolivia, Bridges," thus possibly from eastern Bolivia); 1869b: 364 ("Bolivia").

Bradypus boliviensis Gray, 1871: 442 (type locality "Bolivia," restricted to Buenavista, Santa Cruz, Bolivia, by Cabrera, 1958: 208). Trouessart, 1898: 1095 ("Bolivia"); 1905: 789 ("Bolivia"). Tello, 1986: 19 (observed at Monte de San Pablo, Zapoco, and Los Totamus; reported from other places).

Bradypus infuscatus: Alston, 1879: 183 ("Bolivia"). Trouessart, 1898: 1095 ("Bolivia").

Bradypus cuculliger: Trouessart, 1898: 1096; 1905: 789. Yepes, 1928: 469 (all cite "Bolivia").

Bradypus tridactylus tridactylus: Yepes, 1928: 469 ("Bolivia").

Bradypus tridactylus: Eisentraut, 1932: 40 (Santa Cruz). Arce et al., 1963: 151 (name in list; río Chapare, Todos Santos). Valette et al., 1988: 140 (hosts of *Trypanosoma*, species not determined, from Yungas of La Paz). Stearman, 1990: 380 (Yuquí camp at 1647/6457).

Bradypus tridactylus boliviensis: Krumbiegel, 1941d: 53 (Santa Cruz).

Bradypus (Neobradypus) beniensis Lönnberg, 1942: 22 (type locality "Victoria, Dept. Beni, Bolivia," actually in the department of Pando).

Bradypus: Mann, 1951: plate before p. 41 (photo of head, no specific locality) and plate facing p. 48 (photo of digestive tract, no specific locality). Parker et al., 1993: 46 (seen at the Jardín Botanico near Cotoca).

Bradypus didactylus: Pilleri, 1977b: 47 (name in list).

Bradypterus tridactylus: Eisentraut, 1983: 105 (misspelling of name in list).

Bradypus variegatus boliviensis: Suárez Morales, 1986: 41 (undocumented name in list).

LOCALITIES (18) AND SPECIMENS (51): **Beni:** 1023/6524, río Beni, 1 US; 1052/6525, 5 km S of Guayaramerin, 1 AM; 1059/6606, confluence of río Madre de Dios and río Beni (= Riberalta), 1 Stockholm (Lönnberg, 1942); 1312/6515, 8 km N of Exaltación, 1 AM. **Cochabamba:** 1643/6449, río Chimore, 3 CBF; 1647/6457, Campamento Yuqui, 2 MNLP; 1648/6508, Todos Santos, 1 AM. **Pando:** 1059/6610, Victoria, 1 Stockholm (holotype of *beniensis*); 1102/6844, Cobija, 1 MNLP. **Santa Cruz:** 1720/6320, 1 km W of río Piray, 1 MSB; 1722/6333, 5 km E of río Palometillas, 1 AM; 1724/6346, río Yapacaní, 1 FM; 1724/6351, río Surutú, 1 AM; 1727/6340, Buenavista, 1 AM, 3 ANSP, 4 BM (2 not seen), 4 CM, 4 FM, 2 MACN (not examined); 1747/6310, [grounds of the] Santa Cruz Zoo, 1 MSB; 1748/6310, near Santa Cruz de la Sierra, 2 CM; coordinates unknown, JLD 275, 1 MNK; coordinates unknown, "Santa Cruz" only, 4 (Krumbiegel, 1941d). **Department unknown:** "Bolivia" only, 2 ANSP, 2 BM (holotypes of *boliviensis* and *gularis*), 3 MNLP, 2 MACN (not examined).

FAMILY CHOLOEPIDAE GRAY, 1871

Webb (1978) pointed out that the two-toed sloths are more closely related to the extinct Megalonychidae than to the three-toed sloths, *Bradypus*. Webb assigned *Choloepus* to Megalonychidae. The superfamily Choloepoidea may be used for the families Choloepidae and Megalonychidae.

Genus *Choloepus* Illiger, 1811

Choloepus includes two species, only one of which occurs in Bolivia.

Choloepus hoffmanni Peters, 1859

Two-toed Sloth, Perezoso

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Choloepus hoffmanni* was described by Peters (1859: 128); type locality "Costa Rica," restricted to "Escazú" in San José province by Goodwin (1946: 353) and corrected to Heredia, Volcán Barba, Costa Rica, according to Wetzel and Avila-Pires (1980: 835).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 4 and 5 are of specimens from Guajaramerin (AM 209941) and Campamento Yuquí (MNLP 797).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 506. Photographs, presumably taken in Pando, were published by Izawa (1980g: 78).

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

CONSERVATION STATUS: Judging by the number of specimens, *Choloepus* is less common in Bolivia than is *Bradypus*. However, *Bradypus* may be more diurnal than *Choloepus* and this may have biased the sample. Bolivian *Choloepus* are not listed as endangered or threatened (CITES, Appendix I or II).

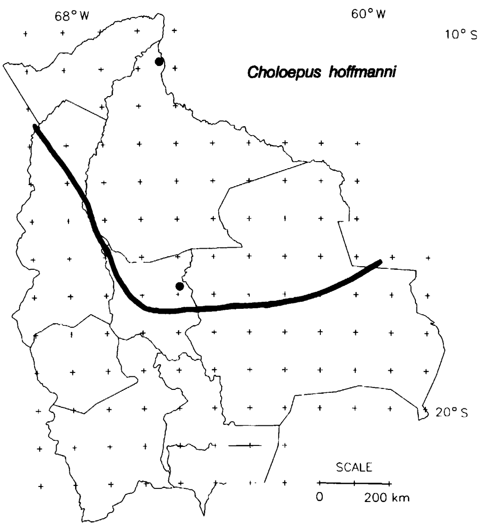


Fig. 506. Localities of known occurrence of *Choloepus hoffmanni.*

Scientific synonyms used for Bolivian specimens are:

Choloepus hoffmanni: Wetzel, 1982: 356 (ecology, map); 1985a: 10. Suárez Morales, 1986: 41 (undocumented name in list). Cameron et al, 1989: 69 (observations in western Pando). Emmons and Feer, 1990: 38 (mentioned Bolivia). Salazar Bravo et al., "1990": 18 (Campamento Yuquí). Le Pont and Desjeux, 1992: 484 (seen at Mururata, 6745/1608). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Anderson, 1993: 29 (general distributional records).

LOCALITIES (2) AND SPECIMENS (2): **Beni:** 1049/6525, near Guayaramerin, 1 AM. **Cochabamba:** 1647/6457, Campamento Yuquí, 1 MNLP.

FAMILY DASYPODIDAE GRAY, 1821

Gray (1821: 305) used the spelling Dasipidae to include "Armadillo, Dasipus. D. tricinctus. Lin." Seven of the eight living genera now placed in the family occur in Bolivia. Cranial measurements of Dasypodidae in table 6 are as follows (adapted from Wetzel, 1980): condylonasal length, palatal length, palatal width, rostral length, interlacrimal breadth, and breadth of braincase.

The only Bolivian dasypodid listed under CITES is *Priodontes maximus*. The carapaces of large numbers of armadillos, especially *Chaetophractus nationi*, are used in the manufacture of mandolinlike musical instruments named charangos.

SUBFAMILY CHLAMYPHORINAE BONAPARTE, 1850

Genus *Chlamyphorus* Harlan, 1825

TAXONOMIC REMARKS: This subfamily was recognized by Gardner (*in* Wilson and Reeder, 1993: 64) for *Chlamyphorus*. Two living species are known, one of which occurs in Bolivia. Generic synonyms used for Bolivian specimens are given to clarify the diverse names used. If *retusus* were placed in a separate genus from *truncatus* because of the different attachment of the carapace or any other reason, the name *Calyptophractus* Fitzinger, 1871, is available for *retusus*. Other generic names are:

Chlamyphorus Harlan, 1825: 235. Type species *Chlamyphorus truncatus* Harlan, 1825: 235, by original designation.

Chlamydophorus Wagler, 1830: 35 (emendation of *Chlamyphorus* Harlan).

Burmeisteria Gray, 1865a: 381. Type species *Burmeisteria retusus*, by original designation. Preoccupied by *Burmeisteria* of Salter, 1865, a trilobite.

Calyptophractus Fitzinger, 1871: 388. Type species *Chlamyphorus retusus* Burmeister, 1863, by original designation.

Chlamyphorus retusus retusus Burmeister, 1863

Northern Pichi-ciego, Coseveru

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 4 and 6 are of specimens from Santa Cruz de la Sierra (CM 2139) and "Santa Cruz" (US 283134).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 507.

HABITAT: Known to inhabit sand dunes in the vicinity of Santa Cruz.

No detailed Bolivian data are available on habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Chlamyphorus retusus Burmeister, 1863: 167 (type locality Santa Cruz de la Sierra, Santa Cruz, Bolivia); 1869: 461 (Santa Cruz de la Sierra). Trouessart, 1898: 1149 (Santa Cruz de la Sierra); 1905: 821 ("Bolivia"). Neveu-Lemaire

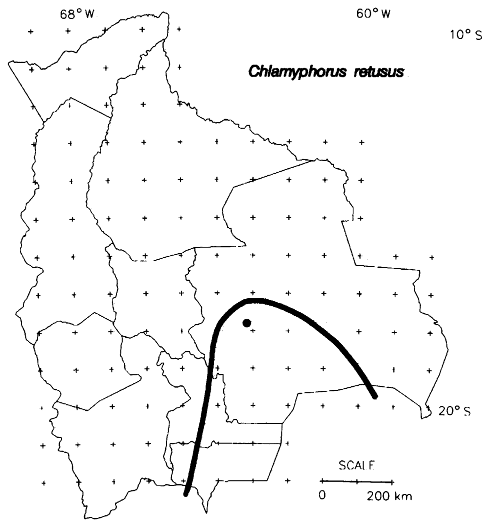


Fig. 507. Localities of known occurrence of *Chlamyphorus retusus retusus.*

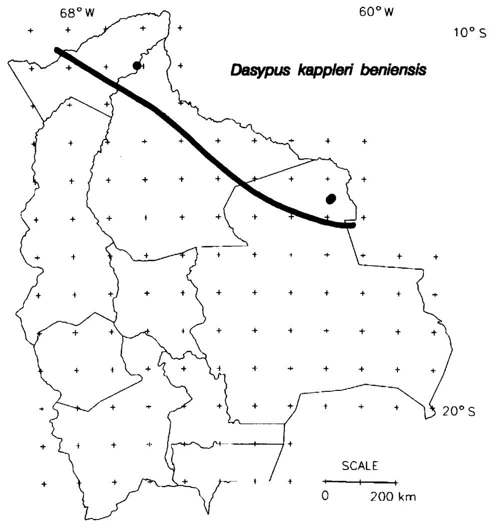


Fig. 508. Localities of known occurrence of *Dasypus kappleri beniensis.*

and Grandidier, 1911: 18, 69. Wetzel, 1982: 370 (photos). Nowak and Paradiso, 1983: 468; Wetzel, 1985a: 14; 1985b: 42. Benirschke, 1986: 26 (specimen, probably from Santa Cruz department, given to him by the director of the zoo in Santa Cruz, presumably Noel Kempff Mercado). Anderson et al., 1993: 35 (vicinity of Santa Cruz de la Sierra).

Burmeisteria retusa: Gray, 1865a: 381 (Santa Cruz de la Sierra); 1869b: 388 (Santa Cruz de la Sierra). Eisentraut, 1983: 105 (use of name in list).

Burmeisteria retusa retusa: Yepes, 1939: 36. Cabrera, 1958: 228.

Chlamyphorus retusus retusus: Anderson, 1993: 30 (general distributional records).

Chlamyphorus: Parker et al., 1993: 102 (reported by local people at Curuyuqui and Perforación).

LOCALITIES (3) AND SPECIMENS (6): **Santa Cruz:** 1748/6310, Santa Cruz de la Sierra, 1 AM, 1 CM, and the holotype, 1 MACN (not examined); coordinates unknown, "Santa Cruz" only, 1 US. **Department unknown:** "Bolivia" only, 1 La Plata, 1 US.

SUBFAMILY DASYPODINAE GRAY, 1821

Wetzel (1985b: 25) divided the subfamily into four tribes: Dasypodini, Euphractini, Priodontini, and Tolypeutini.

TRIBE DASYPODINI GRAY, 1821

Genus *Dasypus* Linnaeus, 1758

Three of the six living species of *Dasypus* occur in Bolivia.

Dasypus kappleri Krauss, 1862

Kappler's Armadillo

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Dasypus kappleri* was described by Krauss (1862: 20), type locality "Den Urwalden des Marowiniflusse in Surinam."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 4 and 6 are of the holotype of *beniensis* and a specimen from Peru (AM 76574). The length along the midline of the dried carapace from Fierros is 470 mm.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 508.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Dasypus kappleri beniensis Lönnberg, 1943

Dasypus kappleri beniensis Lönnberg, 1943: 49 (type locality "near the confluence of Rio Madre de Dios with Rio Beni, Victoria, Bolivia"). Wetzel and Mondolfi, 1979: 56 (no subspecies or specimen cited, "northern Bolivia," subgenus *Hyperoambon*). Suárez, 1986: 41 (undocumented name in list). Anderson, 1993: 30 (general distributional records).

Dasypus kappleri: Wetzel, 1982: 365 (map, no subspecies mentioned); 1985b: 38 (map). Emmons and Feer, 1990: 43 (mentioned Bolivia). Stearman, 1990: 380 (one reported, no voucher specimen so identity uncertain; Yuquí camp at 1647/6457). Ibáñez et al., 1994: 81 (first specimen from Santa Cruz).

LOCALITIES (3) AND SPECIMENS (3): **Pando:** 1059/6610, Victoria, 1 (holotype) Stockholm. **Santa Cruz:** 1430/6053, 4 km N of Los Fierros, 1 EBD; 1433/6056, Los Fierros camp, 1 CBF.

Dasypus novemcinctus Linnaeus, 1758

Vernacular names are nine-banded armadillo (a name that is not always appropriate because the number of bands varies), long-nosed armadillo, toche, tatu, and mulita.

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside Bolivia. *Dasypus novemcinctus* was described by Linnaeus (1758: 51), type locality "America *meridionali*"; Hamlett (1939: 332) implied its restriction to Pernambuco, Brazil, a restriction confirmed by Cabrera (1958: 225).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 4 and 6 are of specimens from 6 km W of Casarabe (AM 255863–255869), 5 km upstream from Cachuelas Monte Verde (AM 262658), Trinidad (AM 262659), Bellavista (BM 1901.2.1.34). Data for Ibiato in table 7 are from W. Townsend (in litt.). Five of the skulls in the large series from Ibiato are of relatively small size and may be of *Dasypus septemcinctus*.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 509.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Data on 17 females were provided by W. Townsend (in litt.), each with four embryos, in the months of July (4), August (9), September (1), October (1), and December (1).

CONSERVATION STATUS: The most common and widely distributed armadillo in Bolivia.

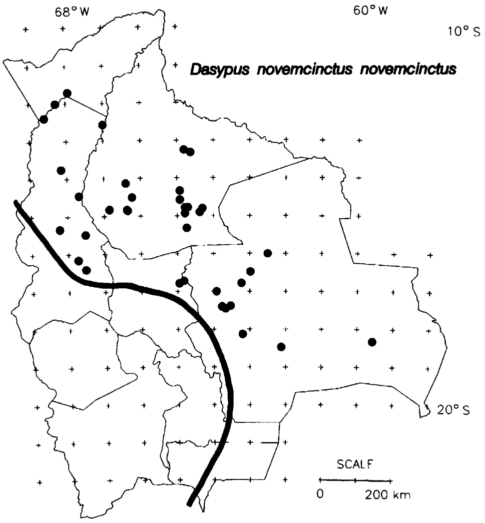


Fig. 509. Localities of known occurrence of *Dasypus novemcinctus novemcinctus*.

Dasypus novemcinctus novemcinctus Linnaeus, 1758

Scientific synonyms used for Bolivian specimens are:

Dasypus novemcinctus: Wetzel, 1985b: 38 (map). Cabot et al., 1986: 42 (undocumented name in list). Suárez Morales, 1986: 41 (undocumented name in list). Tello, 1986: 19 (skin seen in restaurant in San Ignacio). Valette et al., 1988: 139 (hosts of *Trypanosoma cruzi* from Yungas of La Paz). Cameron et al, 1989: 69 (observations in western Pando). Stearman, 1990: 380 (Yuquí camp at 1647/6457). Ergueta and Salazar Bravo, 1991: 22 (general summary). MacPhee, 1994: 29 (comparative drawings of skeletal elements, AMNH 211666, from 1434/6455).

Tatusia brevirostris Gray, 1873b: 16 (type locality not designated; specimens from Rio de Janeiro and from Bolivia; skull figured in plate 3).

Tatusia boliviensis Gray, 1873b: 16 (type locality not designated; one specimen from Bolivia and another without locality; skull figured in plate 3). Trouessart, 1898: 1140 ("Bolivia").

Tatus boliviensis: Trouessart, 1905: 814 ("Bolivia").

Tatu boliviense: Neveu-Lemaire and Grandidier, 1911: 71 ("Bolivia").

Tatu brevirostre: Neveu-Lemaire and Grandidier, 1911: 71 ("Bolivia").

Dasypus boliviensis: Yepes, 1928: 468 ("Bolivia").

Dasypus brevirostris: Yepes, 1928: 468 ("Bolivia").

Dasypus novemcinctus novemcinctus: Vieira, 1955: 405 ("Bolivia"). Crespo, 1974: 13 (Buenavista). Wetzel, 1982: 363. McBee and Baker, 1982: 1 (general information on species). Anderson, 1993: 30 (general distributional records). Anderson et al., 1993: 35 (vicinity of Santa Cruz de la Sierra).

Tatucia novencincta: Arce Pereira et al., 1963: 151 (name in Todos Santos).

Dasypus septennatus: Tello, 1986: 19 ("the most common and abundant of the armadillos," thus probably *D. novencinctus* at least in most cases; *septennatus* is a misspelling of *septemcinctus*).

LOCALITIES (42) AND SPECIMENS (429): **Beni:** 1315/6448, Yutiole, 2 AM; 1319/6437, 5 km S of San Ramón, 1 MSB; 1408/6624, Espíritu, 1 IE; 1420/6455, 10 km W of San Pedro, 2 AM; 1430/6614, Villa Dorita, 14 CBF; 1430/6614, Provincia Ballivian EBB, 11 CBF; 1434/6455, 23 km W of San Javier, 7 AM; 1446/6442, 20 km S of San Javier, 1 AM; 1447/6447, Trinidad, 1 AM; 1448/6418, Ibiato, 129 CBF, 72 MNK (+ 84, W. Townsend, in litt.); 1449/6651, San Borja, 1 EBD; 1450/6622, Estancia Los Tajibos, 1 MNLP; 1451/6621, 50 km E of San Borja on road, 1 EBD; 1451/6621, Estación Biológica del Beni, 9 IE; 1451/6621, La Florida or Hacienda Florida, 7 CBF; 1 EBD; 1454/6422, 6 km W of Casarabe, 7 AM; 1456/6447, 10 km S of Trinidad, 1 (Zalles no. 216, fieldnotes); 1519/6444, Camiaco, 1 AM; coordinates unknown, Hacienda Conquista EBB, 3 CBF; coordinates unknown, Hacienda El Triunfo EBB, 2 CBF; **Cochabamba:** 1643/6449, río Chimoré, 30 CBF; 1647/6457, Campamento Yuquí, 1 MNLP. **La Paz:** 1234/6700, río Madidi, 8 km from mouth, 1 MSB; 1345/6809, Isiamas, 1 US; 1427/6741, 12 km W of San Buenaventure, 1 AM; 1520/6813, Bellavista, 1 BM; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 1 MSU, 1 TTU; 1609/6744, Chijchijpa, 1224 m, 1 CBF; 1624/6731, Chulumani, 1 BM. **Pando:** 1142/6756, Palmira, 1 AM; 1200/6816, río Madre de Dios, 5 km upstream from Cachuelas Monte Verde, 1 AM; 1223/6835, Chivé, 1 AM. **Santa Cruz:** 1600/6230, Totaitu, 1 MNK; 1629/6259, 142 km N of Santa Cruz, 1 MNLP; 1647/6314, Estancia Cachuela Esperanza, 1 AM; 1700/6355, Ayacucho, 1 AM; 1723/6332, San Miguel Rincón, 1 AM; 1724/6346, río Yapacaní, 125 km N of Santa Cruz, 1 ZFMH (R. M. Wetzel personal commun.); 1727/6340, Buenavista, 1 AM, 1 ANSP, 2 BM, 3 FM, 3 MACN (reported by Crespo, 1974); 1808/6312, 7 km E and 3 km N of Ingeniero Mora, 2 AM; 1819/5934, Santiago, 2 FM; 1828/6207, 8 km SE of Tita, 1 AM; coordinates unknown, no specific locality, 1 AM, 2 FM. **Department unknown:** Bolivia, 1 BM (unregistered skull only, "Type of *Tatusia boliviensis*" on label); perhaps Beni, 1 MNK; perhaps Bolivia, 2 MNLP.

Dasypus septemcinctus Linnaeus, 1758

Seven-banded Armadillo

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Dasypus septemcinctus* was described by Linnaeus (1758: 51), type locality "Indiis"; Hamlett (1939: 332) implied its restriction to Pernambuco, Brazil, and Cabrera (1958: 226) ratified that restriction.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in table 10 are of a specimen from the state of São Paulo in Brazil (FM 52354). Measurements of the specimen from San Joaquín (FM 119371) are length along midline of carapace (dried) 213 mm, length of tail armor 185, length of dried ear from margin of head shield 29, estimated length of dried ear from notch 29, length of head shield 68, width of head shield 32.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 510.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

CONSERVATION STATUS: Rare.

Scientific synonyms used for Bolivian specimens are:

Dasypus septemcinctus: Wetzel and Mondolfi, 1979: 53 (Villa Montes and San José de Chiquitos). Wetzel, 1982: 365 (no mention of Bolivia); 1985a: 17 (southeastern Bolivia); 1985b: 40 (Santa Cruz). Anderson, 1993: 30 (general distributional records).

Tatusia septemcincta: Gerrard, 1862: 187 (one from "Bolivia," Bridges's collection, identity uncertain, not seen by me).

Tatus hybridus: Krieg, 1929a: 189 (Bolivian Chaco).

LOCALITIES (5) AND SPECIMENS (9): **Beni:**

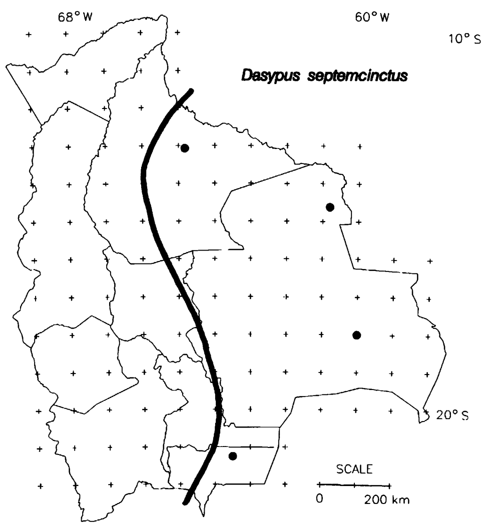


Fig. 510. Localities of known occurrence of *Dasypus septemcinctus*.

1304/6449, San Joaquín, 1 FM; 1448/6418, Ibiato, 4 CBF. **Santa Cruz:** 1437/6048, 36–45 km E of Aserradero Moira, 1 EBD; 1800/6000, San José de Chiquitos, 2 ZSM (Wetzel and Mondolfi, 1979). **Tarija:** 2115/6330, Villa Montes, 1 ZMB (Wetzel and Mondolfi, 1979).

Dasypus, species not determined

Not yet identified to species.

Localities (4) and Specimens (4): **Beni:** 1059/6606, Riberalta, 1 US (not seen); 1311/6408, 1 (Zalles no. 205, fieldnotes). **Cochabamba:** 1647/6457, Campamento Yuquí, 1 MNLP (not seen). **La Paz:** 1345/6809, Isiamas, 1 US (not seen). **Santa Cruz:** 1608/6202, Concepción, 1 MNLP.

TRIBE EUPHRACTINI WEBER, 1928

Tribe recognized by Wetzel (1985b: 25). Weber (1928: 220) used the family group name Euphracti.

Genus *Chaetophractus* Fitzinger, 1871

The three living species of *Chaetophractus* all inhabit Bolivia.

Chaetophractus nationi (Thomas), 1894

Andean Armadillo, Quirquincho Mediano

Morphological Characters and Comparisons: Measurements in tables 4 and 6 are of specimens from Cerdas (ANSP 19372) and El Choro (CBF 1624). The latter was measured by Teresa Tarifa and Nuria Bernal.

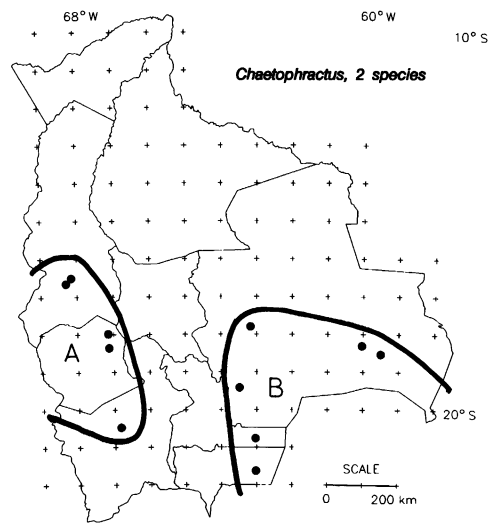


Fig. 511. Localities of known occurrence of two species of *Chaetophractus*, *C. nationi* (A) and *C. vellerosus* (B).

Distributional Notes: Known localities are listed below and mapped in figure 511.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Karyology: The diploid number of chromosomes is 62, the fundamental number of chromosomal arms is 90 (Cook et al., 1991: 23; one male specimen was studied).

Scientific synonyms used for Bolivian specimens are:

Dasypus Nationi Thomas, 1894a: 70 (type locality "Orujo" = Oruro, Bolivia). Neveu-Lemaire and Grandidier, 1911: 18, 99.

Dasypus (*Chaetophractus*) *nationi*: Trouessart, 1898: 1146; 1905: 820 ("Bolivia").

Dasypus boliviensis Grandidier and Neveu-Lemaire, 1908: 5, fig. 3 (type locality Uyuni, Potosí, Bolivia). Neveu-Lemaire and Grandidier, 1911: 18, 99 (Uyuni). Neveu-Lemaire, 1913: 220 (Uyuni).

Chaetophractus nationi: Yepes, 1928: 468, 499. Mann, 1951: plate adjacent to p. 185 (photos, no exact locality). Cabrera, 1958: 213. Wetzel, 1982: 357 (status regarded as uncertain); 1985a: 13; 1985b: 26 (mapped with *C. vellerosus*). Suárez Morales, 1986: 52 (undocumented name in list). Ergueta and Salazar Bravo, 1991: 21 (general summary). Cook et al., 1991: 21 (chromosomes). Anderson, 1993: 29 (general distributional records). Yensen and Tarifa, 1993: 51 (Cerro Quisi Quisini). Yensen et al., 1994: 406 (Cerro Quisi Quisini).

Chaetophractus vellerosus vellerosus: Cabrera, 1958: 214 (listed *Dasypus boliviensis* Grandidier and Neveu-Lemaire, 1908, as a synonym).

Euphractus nationi: Moeller, 1975: 163 (as "subspecies of *E. villosus*").

Ch[*aetophractus*]. *boliviensis*: Suárez Morales, 1986: 52 (undocumented synonym in list).

Ch[*aetophractus*]. *sajama*: Suárez Morales, 1986: 52 (a *nomen nudum* given as an undocumented synonym in a list)

LOCALITIES (8) AND SPECIMENS (24): **La Paz:** 1630/6809, La Paz valley, 1 MCZ (not seen); 1630/6809, La Paz, 12 MACN; 1639/6818, Viacha, 1 MCZ. **Oruro:** 1759/6709, Oruro, 1 BM (holotype); 1759/6709, Arenales de Oruro (coordinates uncertain), 1 Bern (Schmid, in litt., as *C. villosus*, but perhaps actually *C. nationi*); 1816/6904, south slope of Cerro Quisi Quisini, 1 CBF; 1821/6708, El Choro, 1 MNLP. **Potosí:** 2028/6650, Uyuni, 3 Paris (Grandidier and Neveu-Lemaire, 1908). **Department unknown:** from market in La Paz, 1 BM; perhaps Bolivia [in Bolivian collection, no data], 2 MNLP.

Chaetophractus vellerosus (Gray), 1865

Small Hairy Armadillo, Quirquincho

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 4 and 6 are of specimens from 41 km NW of Roboré (AM 260318) and Santa Cruz de la Sierra (BM 47.11.22.20).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 511.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Dasypus vellerosus Gray, 1865a: 376 (type locality "Santa Cruz de la Sierra," Santa Cruz, Bolivia); 1869b: 381 (Santa Cruz de la Sierra). Neveu-Lemaire and Grandidier, 1911: 18, 966.

Chaetophractus vellerosus: Gray, 1873b: 19 (Santa Cruz de la Sierra). Myers and Wetzel, 1979: 640 (did not use subspecies, no specific reference to Bolivia). Wetzel, 1985a: 13 (southeastern Bolivia); 1985b: 28 (map). Anderson et al., 1993: 35 (vicinity of Santa Cruz de la Sierra).

Dasypus (*Chaetophractus*) *vellerosus*: Trouessart, 1898: 1146 (Santa Cruz de la Sierra); 1905: 820 ("Bolivia").

Dasypus villerosus: Grandidier and Neveu-Lemaire, 1908: 6.

Chaetophractus vellerosus vellerosus: Yepes, 1928: 468, 500; 1929: 443 (mapped range as extending into Bolivia). Wetzel, 1982: 358. Anderson, 1993: 29 (general distributional records).

Zaedyus ciliatus: Krieg, 1929a: 177 (W Gran Chaco and río Pilcomayo W of Villa Montes).

Euphractus vellerosus: Moeller, 1975: 163 (as "subspecies of *E. villosus*").

LOCALITIES (9) AND SPECIMENS (12): **Chuquisaca:** 2046/6302, 6 km by road E of Carandayti, 1 AM. **La Paz:** 1630/6809, La Paz, 2 MCZ (not seen, needs comparison with *C. nationi*). **Potosí:** 2048/6629, Cerdas, 1 ANSP (needs comparison with *C. nationi* also). **Santa Cruz:** 1748/6310, Santa Cruz de la Sierra, 1 BM (holotype); 1748/6310, "Santa Cruz" only, 1 Bern (P. Schmid, in litt.); 1818/6002, 41 km by road NW of Roboré, 1 AM; 1831/5930, San Ramón, 1 (R. M. Wetzel, personal commun.); 1925/6329, Laguna Caucaya, 10 km E Gutierrez, 1 AM. **Tarija:** 2138/6301, Estancia Caballo Nambia, 1 (R. M. Wetzel, personal commun.). **Department unknown:** "Bolivia," 1 Bern (P. Schmid, in litt.), 1 BM.

Chaetophractus villosus (Desmarest), 1804

Large Hairy Armadillo, Quirquincho

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside Bolivia. *Loricatus villosus* was described by Desmarest (1804, table 28), type locality "Les Pampas" of Buenos Aires to the south of the río de la Plata, between 35 and 36°S latitude.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 4 and 6 are of a specimen from "Bolivia" (BM 1975.577).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 512.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

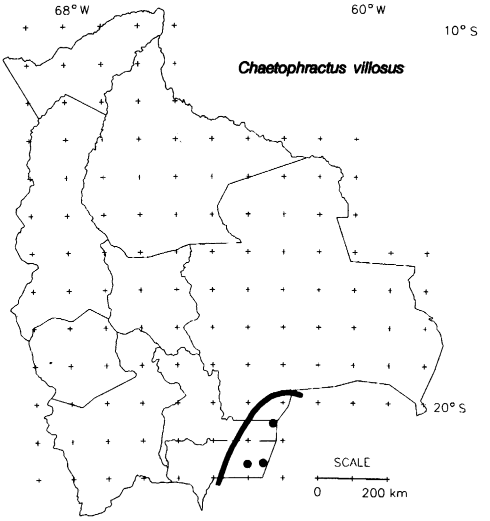


Fig. 512. Localities of known occurrence of *Chaetophractus villosus.*

Scientific synonyms used for Bolivian specimens are:

Chaetophractus villosus: Gray, 1873b: 19 ("Bolivia"). Cabrera, 1958: 214. Myers and Wetzel, 1979: 640 (Bolivian border near Sgto. Rodriguez, Paraguay). Wetzel, 1982: 358 ("possibly Chaco of Bolivia"); 1985b: 28 ("probably the Chaco of Bolivia"). Anderson, 1993: 29 (general distributional records).

Dasypus (*Chaetophractus*) *villosus*: Trouessart, 1898: 1146; 1905: 820 ("Bolivia"). Neveu-Lemaire and Grandidier, 1911: 95 ("Bolivia").

Dasypus villosus: Eisentraut, 1933: 68 (title suggests Bolivia, nothing more specific).

Euphractus villosus: Moeller, 1975: 163, 164 (map).

LOCALITIES (3) AND SPECIMENS (8): **Chuquisaca:** 2033/6217, Bolivian border near Sgto. Rodriguez, Paraguay, 2 UCONN. **Tarija:** 2136/6234, 4 km N of Estancia Bolivar, 1 CBF; 2138/6301, Estancia Caballo Nambia, 90 km SE of Villa Montes, 1 ZFMK (R. M. Wetzel, personal commun.). **Department unknown:** Bolivia, 4 BM (2 not seen).

Chaetophractus, species not determined

Santa Cruz: 1846/6214, Curuyuqui, 1 (Parker et al., 1993: 101).

Genus *Euphractus* Wagler, 1830

TAXONOMIC REMARKS: I have not been able to determine the status of *Euphractus minutus* of Gray (1873b: 19), who mentioned two Bolivian specimens. Cabrera (1958: 217) treated *Euphractus minutus* of Gray (1865c: 577) as a synonym of *Zaedyus pichiy*, which is known definitely only in Argentina. The two specimens are BM 45.11.18 34 and 45.11.18.33, both obtained by Bridges. On one of my visits to the British Museum, I recorded the latter specimen as *Chaetophractus vellerosus*, but only the lower jaw was seen. Gray (1873b: 19) noted that the specimen was "stuffed"; perhaps the other Bolivian specimen is of *Tolypeutes*, but my notes do not indicate that I saw it.

The single living species occurs in Bolivia.

Euphractus sexcinctus (Linnaeus), 1758

Vernacular names are six-banded armadillo, sechsbindige Gurteltier, guacalote, peji grande, and quirquincho de seis bandas.

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Dasypus sexcinctus* was described by Linnaeus (1758: 51); type locality "America *Meridionali*," restricted by implication to "Para," Brazil, by Thomas (1907b: 165).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 4 and 6 are of specimens from 7 km SE of Carandaity (LACM 60643), Buenavista (BM 26.1.12.20, FM 34346, 34348–34350), and "Bolivia" (BM 1846.7.28.11). Data for Ibiato in table 7 are from W. Townsend (in litt.).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 513.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

The one subspecies that occurs in Bolivia and synonyms used for Bolivian specimens are:

Euphractus sexcinctus boliviae (Thomas), 1907

Dasypus sexcinctus var. 2: Gray, 1873b: 18 ("Bolivia").

Dasypus sexcinctus boliviae Thomas, 1907b: 166 (type locality "Near Santa Cruz de la Sierra,

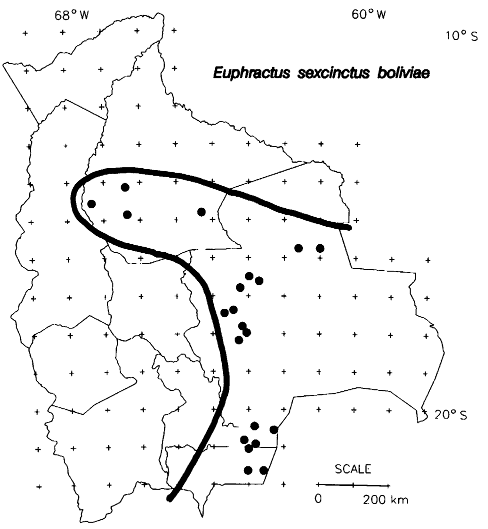


Fig. 513. Localities of known occurrence of *Euphractus sexcinctus boliviae.*

Bolivia"; skin label of holotype has "Prov. of Sara").

Euphractus sexcinctus bolivae: Yepes, 1928: 468, 491. Lönnberg, 1942: 55. Cabrera, 1958: 215.

Dasypus sexcinctus: Eisentraut, 1933: 65 (reported from near Villa Montes, but cited no specimen, or subspecies). Arce Pereira et al., 1963: 151 (name in list; Todos Santos).

Euphractus sexcinctus: Moeller, 1975: 163 (map). Wetzel, 1982: 357 (ecology, map); 1985b: 26 (map). Eisentraut, 1983: 108 (name in list). Redford and Wetzel, 1985: 2 (general information on species). Tello, 1986: 20 (collected at Los Palmares and reported from Puerto Suares). Parker et al., 1993: 102 (reported by local people at Curuyuqui and Perforación).

Euphractus sexcinctus boliviae: Suárez Morales, 1986: 41 (undocumented name in list). Anderson, 1993: 29 (general distributional records). Anderson et al., 1993: 34 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (23) AND SPECIMENS (44): **Beni:** 1408/6624, Espíritu, 2 IE; 1433/6720, Bresta, río Beni, 2 Stockholm (Lönnberg, 1942); 1448/6418, Ibiato, 7 MNK (+ 7, W. Townsend, in litt.); 1451/6621, Estación Biológica del Beni, 1 IE. **Chuquisaca:** 2033/6217, Bolivian border near Sgto. Rodriguez [Paraguay], 1 Univ. Connecticut; 2049/6308, 10 km SE of Carandaity, 1 LACM; 2055/6248, Bañado Yagüapua, 64 km E Tiquipa, 1 AM. **Santa Cruz:** 1545/6100, Los Palmares, 1 MNK. 1545/6136, Km 162 de San Ramón, 1 MNK, not seen; 1629/6259, 142 km N of Santa Cruz, 1 MNLP; 1636/6242, 10 km N of San Ramón, 1 MSB; 1647/6314, Estancia Cachuela Esperanza, 1 AM; 1722/6325, province of Sara, 1 BM, (holotype of *boliviae*); 1727/6340, Buenavista, 3 AM, 1 BM, 2 FM, 1 MACN (not examined); 1748/6310, Santa Cruz de la Sierra, 1 BM (holotype); 1758/6303, 27 km SE of Santa Cruz, 1 MSB; 1810/6316, Ingeniero Mora, 1 AM; 2027/6250, 53 km E of Boyuibe, 1 MSB; coordinates unknown, specific locality unknown, 5 FM. **Tarija:** 2103/6300, 7 km N of Capirenda, 1 LACM; 2138/6234, Estancia Bolivar, 1 CBF; 2138/6301, Estancia Caballo Nambia, 90 km SE of Villa Montes, 1 ZFMK (R. M. Wetzel, personal commun.). **Department unknown:** coordinates unknown, Pampa de Mojos, 1 (Krumbiegel, 1940a); Bolivia, 1 BM (46.7.28.11), 1 MACN (not examined); perhaps Bolivia [in a Bolivian collection, no data], 1 MNLP.

TRIBE PRIODONTINI WEBER, 1928

Genus *Cabassous* McMurtrie, 1831

Only one of the four living species is known to occur in Bolivia, but another one, *C. chacoensis*, will probably be found to occur also in the Gran Chaco in southeastern Bolivia (Wetzel, 1982: 360; 1985a: 15; 1985b: 31, map).

Cabassous unicinctus (Linnaeus), 1758

Naked-tailed Armadillo, Cabasu

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Dasypus unicinctus* was described by Linnaeus (1758: 50); type locality "Africa" restricted by Buffon (1763) to "l'Amerique" and tentatively by Thomas (1911c: 141), who wrote that "Surinam may be suggested, if *Cabassous* occurs there." It does occur there (Husson, 1978: 259). *Xenurus squamicaudis* was described by Lund (1842a: lxxxiv), type locality caves of Lagoa Santa, Minas Gerais, Brazil.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 4 and 6 are of this specimen (AM 209943).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 514.

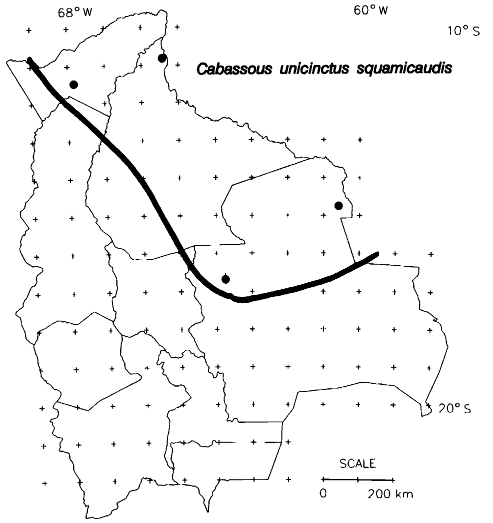


Fig. 514. Localities of known occurrence of *Cabassous unicinctus squamicaudis*.

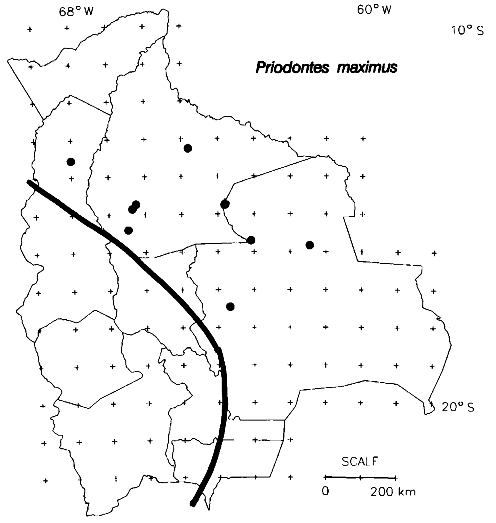


Fig. 515. Localities of known occurrence of *Priodontes maximus*.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Cabassous unicinctus squamicaudis
(Lund), 1842

Cabassous unicinctus: Vieira, 1955: 403 ("Bolivia," with no further documentation).

Cabassous unicinctus squamicaudis: Wetzel, 1980: 346 (first use of the name combination); 1982: 360 (ecology); 1985b: 31 (map). Anderson, 1993: 30 (general distributional records).

Localities (4) and Specimens (4): **Beni:** 1049/6525, Guayaramerin, 1 AM. **Pando:** 1128/6750, 15 km NO de [= NW of] Puerto Camacho, 1 CBF. **Santa Cruz:** 1445/6035, 52 km S of Campamento Los Fierros, 1 MNK; 1640/6345, 80 km N of San Carlos, 1 AM.

Genus *Priodontes* F. Cuvier, 1825

The only living species occurs in Bolivia.

Priodontes maximus (Kerr), 1792

Giant Armadillo, Armadillo Gigante,
Tatu Guasu,
Tatu Carreta, Tatu Grande, Pejiche

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Dasypus maximus* was described by Kerr (1792: 112), type locality "Cayenne," French Guiana.

Morphological Characters and Comparisons: Measurements in tables 4 and 6 are of specimens from Buenavista (CM 20942, 5055).

Distributional Notes: Known localities are listed below and mapped in figure 515.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Conservation Status: Listed as endangered under CITES Appendix I.

Scientific synonyms used for Bolivian specimens are:

Priodontes giganteus: Trouessart, 1898: 1148; 1905: 821 ("Bolivia"). Neveu-Lemaire and Grandidier, 1911: 18 (vicinity of Santa Cruz de la Sierra). Krieg, 1929a: 179 (eastern Santa Cruz). Krumbiegel, 1940a: 54 (Chiquitos). Suárez Morales, 1986: 123 (undocumented name in list). Tello, 1986: 19 (remains seen at Laguna Bay and at San Ignacio).

Priodontes maximus: Wetzel, 1982: 360 (map, comment on name); 1985b: 29 (map). Cabot et al., 1986: 42 (undocumented name in list). Suárez Morales, 1986: 41 (undocumented name in list). Ergueta and Salazar, 1991: 23 (general summary). Vargas and Mendez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Anderson, 1993: 29 (general distributional records). Anderson et al., 1993: 35 (vicinity of Santa Cruz de la Sierra). Parker et al., 1993: 102 (reported by local people at Curuyuqui).

Localities (10) and Specimens (16): **Beni:** 1315/6448, Yutiole, 1 AM; 1444/6615, Campamento 08, 2 MNLP; 1451/6621, Estación Biológica del Beni, 1 CBF; 1524/6628, 75 km S of San Borja, río Maniqui, 1 MNLP. **La Paz:** 1333/6800, Arroyo San Francisco, Ixiamas, 1 MNLP. **Santa Cruz:** 1444/6359, mouth of río Negro at río San Pablo, 1 (in Zalles's fieldnotes, perhaps at MNK); eastern Bolivia, at about 15°S latitude, 1 US; 1542/6305, Ascención, 1 MSB; 1550/6127, Santa Rosa de la Roca, 1 MNK; 1727/6340, Buenavista, 1 CM, 1 FM (not seen). **Department unknown:** perhaps Bolivia [in a Bolivian collection, no data], 3 MNLP.

TRIBE TOLYPEUTINI WEBER, 1928

Genus *Tolypeutes* Illiger, 1811

Two living species of *Tolypeutes* are recognized, only one of which occurs in Bolivia.

Tolypeutes matacus (Desmarest), 1804

Three-banded Armadillo, Corechi, Quirquincho Bola

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Loricatus matacus* was described by Desmarest (1804, table 28); type locality not mentioned, restricted by Sanborn (1930: 66) to "Tucuman, Province of Tucuman, Argentina." Osgood (1919: 33) first used the name combination *Tolypeutes matacus*.

Morphological Characters and Comparisons: Measurements in tables 4 and 6 are of specimens from 64 km E of Tiquipa (AM 246459–246461), 15 km NE of Capirenda (LACM 27349–27350), 12 km SW of Capirenda (LACM 62848).

Distributional Notes: Known localities are listed below and mapped in figure 516.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

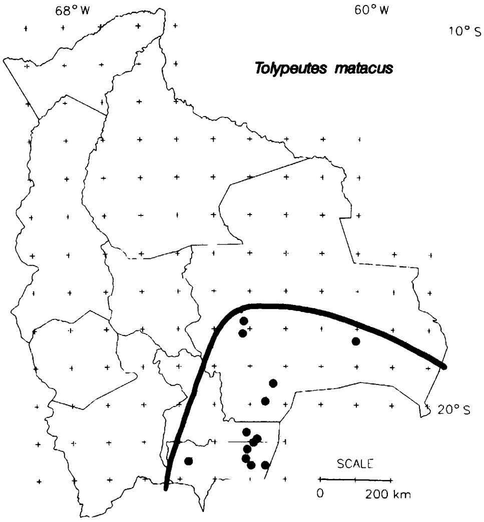


Fig. 516. Localities of known occurrence of *Tolypeutes matacus*.

Tolypeutes conurus I. Geoffroy Saint-Hilaire, 1847: 137 (type locality not explicitly stated but implied as "Habite le Tucuman et les Pampos de Buenos-Ayres" and Santa Cruz de la Sierra [after d'Orbigny]). Garrod, 1878: 225 (Santa Cruz de la Sierra). Trouessart, 1898: 1149 (Santa Cruz de la Sierra); 1905: 821 ("Bolivia"). Neveu-Lemaire and Grandidier, 1911: 18, 82 (Santa Cruz de la Sierra). Krieg, 1929a: 185 (mountains of Chiquitos). Eisentraut, 1933: 66 (title suggests Bolivia, perhaps near Villa Montes, some observations on reproduction, habitat, and behavior). Krumbiegel, 1940a: 64 (Tapikiole).

Tatusia tricincta: Gray and Gray, 1847: 73 (a specimen from "Bolivia" in Bridges's collection). Gerrard, 1862: 286 (one Bolivian skull from Bridges' collection).

Tolypeutes tricinctus: Gray, 1865a: 380 ("Bolivia"); 1869b: 386 ("Bolivia"). Trouessart, 1898: 1148; 1905: 821 ("Bolivia"). Yepes, 1928: 467 ("Bolivia"). Krieg, 1929a: 186 (N and NW department of Santa Cruz and N Chiquitos). Eisentraut, 1983: 29, 106 (photos, name in list).

Tolypoides bicinctus Grandidier and Neveu-Lemaire, 1905: 370 (type locality Tarija, Bolivia); 1908: 4. Neveu-Lemaire and Grandidier, 1911, pp. 18, 86. Neveu-Lemaire, 1913: 221 (Tarija).

Tolypeutes Muriei: Neveu-Lemaire and Grandidier, 1911: 18, 83.

Tolypeutes matacus: Cabrera, 1958: 221 (eastern Bolivia). Wetzel, 1985a: 14 (Santa Cruz); 1985b: 37 (Santa Cruz). Suárez Morales, 1986: 41 (undocumented name in list). Tello, 1986:

19 ("collected" at Los Palmares, but the whereabouts of specimen unknown to me, reported from near Puerto Suáres). Ergueta and Salazar, 1991: 21 (general summary, illustration inaccurate). Parker et al., 1993: 101 (Curuyuqui, Perforación). Anderson, 1993: 30 (general distributional records). Anderson et al., 1993: 35 (vicinity of Santa Cruz de la Sierra).

Tolypeutes matacos: Yepes, 1928: 467 ("Bolivia").

Tolypeutes tricinctus matacus: Sanborn, 1930: 66 (Santa Cruz de la Sierra and Tarija).

Tolypeutes mataco: Suárez Morales, 1986: 121 (undocumented name in list). Yepes, 1928: 467 ("Bolivia").

LOCALITIES (14) AND SPECIMENS (29): **Chuquisaca:** 2045/6306, 4.5 km by road W of Carandayti, 1 MSB; 2055/6248, 64 km E of Tiquipa (71 km by road E of Tiquipa, Bañado Yugüapua), 3 AM. **Santa Cruz:** 1748/6310, Santa Cruz de la Sierra, 1 BM (Sanborn, 1930), 2 FM, 1 Paris (Sanborn, 1930, after Grandidier); 1808/6312, 7 km E and 3 km N of Ingeniero Mora, 1 AM; 1819/6002, 29.5 km W of Roboré, 1 AM; 1846/6214, Curuyuqui (Parker et al., 1993: 101); 1927/6221, Cerro Colorado, 3 EBD; 1955/6233, Puesto Perforación, 1 (Parker et al., 1993: 101). **Tarija:** 2101/6254, 15 km NE of Capirenda, 2 LACM; 2112/6305, 12 km SW of Capirenda, 1 LACM; 2127/6307, Palo Marcado, 2 Frankfurt (Felten, in litt.); 2131/6445, Tarija, 2 Paris (Sanborn, 1930, after Grandidier); 2138/6234, Estancia Bolivar, 2 CBF; 2138/6258, Estancia Caballo Nambia, 1 ZFMK (R. M. Wetzel, personal commun.). **Department unknown:** perhaps Bolivia [in a Bolivian collection, no data], 2 BM, 3 MNLP.

FAMILY MYRMECOPHAGIDAE GRAY, 1825

Cranial measurements of Myrmecophagidae in table 7 are as follows (adapted from Wetzel, 1975: 99): occipital length, interorbital breadth, interlacrimal breadth, rostral length, nasal length, and breadth of braincase.

Although long thought to be strictly American, the family may have been present as early as the Eocene in Germany (Storch, 1993). However, the placement of *Eurotamandua* in Myrmecophagidae has been questioned (Rose and Emry, 1993: 96).

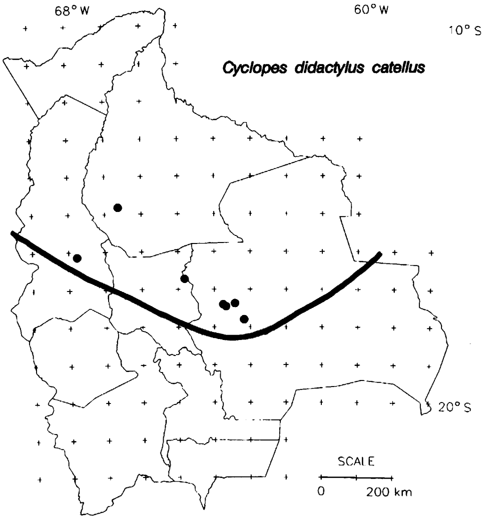


Fig. 517. Localities of known occurrence of *Cyclopes didactylus catellus*.

Genus *Cyclopes* Gray, 1821

Cyclopes includes only one species.

Cyclopes didactylus (Linnaeus), 1758

Pygmy Anteater, Osito de Oro, Oso Hormiguero

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Myrmecophaga didactyla* Linnaeus (1758: 35); type locality "America *australi*" restricted by Thomas (1911c: 132) to "Surinam."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 4 and 7 are of specimens from Santa Cruz (CM 1934, 2144, 2763) and 22 km E of San Borja (AM 262656).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 517.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

CONSERVATION STATUS: Not listed under CITES.

Scientific synonyms used for Bolivian specimens are:

Cyclopes didactylus catellus Thomas, 1928

Cyclopes didactylus catellus Thomas, 1928b: 293 (type locality Buenavista, Santa Cruz, Bolivia).

Krumbiegel, 1940b: 180 (Buenavista and Santa Cruz region). Wetzel, 1982: 351 (ecology, map). Suárez Morales, 1986: 40 (undocumented name in list). Anderson, 1993: 29 (general distributional records). Anderson et al., 1993: 34 (vicinity of Santa Cruz de la Sierra).

Cyclopes didactylus: Arce Pereira et al., 1963: 151 (name in list; río Chapare). Wetzel, 1985a: 6. Cabot et al., 1986: 42 (undocumented name in list). Tello, 1986: 19 (mentioned a specimen from lowland evergreen forest near Monte San Pablo, but I don't know where it is now). Cameron et al, 1989: 69 (local reports in western Pando). Emmons and Feer, 1990: 35 (mentioned Bolivia).

Localities (8) and Specimens (36): **Beni:** 1449/6638, 22 km E of San Borja, 1 AM. **Cochabamba:** 1643/6449, río Chimoré, 1 CBF. **La Paz:** 1608/6746, between Suapi and Mururata, 1 MNLP. **Santa Cruz:** 1722/6325, province of Sara, 1 CM (not seen); 1724/6345, San Carlos, 1 MNK; 1727/6340, Buenavista, 5 BM, 2 CM, 2 FM, 4 MACN (not examined); coordinates unknown, Pocitos, near road to Montero, NE of Santa Cruz de la Sierra, 1 UMMZ; 1748/6310, Santa Cruz de la Sierra, 4 CM, 1 US, 5 MACN (not examined); coordinates unknown, from pet shop, 2 LACM. **Department unknown:** "Bolivia," 1 FM, 1 MACN, 3 MNLP.

Genus *Myrmecophaga* Linnaeus, 1758

There is only one species in the genus.

Myrmecophaga tridactyla Linnaeus, 1758

Giant Anteater, Banded Anteater, Grosser Ameisenbar,
Oso Bandera, Oso Hormiguero,
Oso Comilon, Yurumi

Taxonomic Remarks: *Myrmecophaga tridactyla* was described by Linnaeus (1758: 35); type locality "America *meridionali*," restricted to Pernambuco, Brazil, by Thomas (1911c: 132).

Morphological Characters and Comparisons: Measurements in tables 4 and 7 are of specimens from El Consuelo on the río Beni (Lönnberg, 1942) and Buenavista (BM 28.2.9.75).

Distributional Notes: Known localities are listed below and mapped in figure 518.

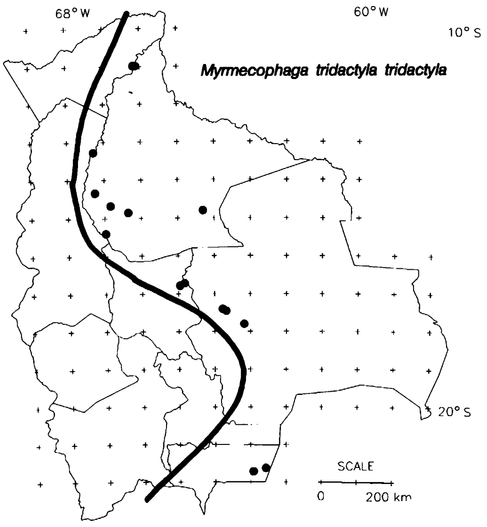


Fig. 518. Localities of known occurrence of *Myrmecophaga tridactyla tridactyla*.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Parasites: Coccidian parasites of the species *Eimeria escomeli* were reported by Gardner et al. (1991: 16).

Reproduction: Three juvenile individuals, precise ages unknown, were recorded in September (2) and in December (1). A female with one embryo was recorded in January.

Conservation Status: Listed as "threatened" under CITES Appendix II.

Scientific synonyms used for Bolivian specimens are:

Myrmecophaga tridactyla tridactyla Linnaeus, 1758

Myrmecophaga tridactyla: Eisentraut, 1933: 64 (in the Chaco north of the Pilcomayo and north of Samuhuate). Lönnberg, 1942: 30 (localities in Beni and Pando). Arce Pereira et al., 1963: 150 (name in list; Chapiriri, Todos Santos). Wetzel, 1982: 347 (ecology, map). Eisentraut, 1983: 105 (name in list). Tello, 1986: 18 (observed at Monte San Pablo, tracks seen near Laguna Bay and at Los Palmares). Cabot et al., 1986: 42 (name in list). Cameron et al, 1989: 69 (local reports in western Pando). Stearman, 1990: 380 (Yuquí camp at 1647/6457). Gardner et al., 1991: 16 (coccidial parasites, 1316/6717). Ergueta and Salazar, 1991: 19 (general summary). Parker et al., 1993: 101 (seen near Curuyuqui, Perforación, and 2003/6238 in southern Santa Cruz).

Myrmeocophage jubata: Pilleri, 1977b: 47 (name in list).

Myrmecophaga tridactyla tridactyla: Suárez Morales, 1986: 40 (undocumented name in list). Anderson, 1993: 28 (general distributional records). Anderson et al., 1993: 34 (vicinity of Santa Cruz de la Sierra).

Myrmeophaga tridactila: Suárez Morales, 1986: 123 (undocumented name in list).

Mymercophaga tridactyla: Vargas and Mendez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area).

Localities (15) and Specimens (22): **Beni:** 1059/6606, Riberalta, 1 (Lönnberg, 1943); 1420/6715, El Consuelo, 3 (Lönnberg, 1943); 1440/6650, Espíritu, 1 MNLP; 1448/6418, Ibiato, 1 CBF; 1451/6621, Estación Biológica del Beni, 1 MNLP; 1524/6658, 75 km S of San Borja, río Maniqui, 1 MNLP. **Cochabamba:** 1643/6449, río Chimore, 1 CBF; 1647/6457, Campamento Yuquí, 1 MNLP. **La Paz:** 1316/6717, río Beni, 1 MNLP. **Pando:** 1059/6610, Victoria, 1 (Lönnberg, 1943); **Santa Cruz:** 1724/6346, río Yapacaní, 1 MACN; 1727/6340, Buenavista, 1 BM, 3 MACN; 1748/6310, Santa Cruz de la Sierra, 1 IML. **Tarija:** 2138/6234, Estancia Bolivar, 2 CBF; 2143/6255, Samuhuate (Eisentraut, 1933: 64). **Department uncertain:** perhaps Bolivia [in a Bolivian collection, no data], 2 MNLP.

Genus *Tamandua* Gray, 1825

Tamandua includes two living species, only one of which occurs in Bolivia.

Tamandua tetradactyla (Linnaeus), 1758

Anteater, Oso Hormiguero Rubio, Tamandu

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Myrmecophaga tetradactyla* was described by Linnaeus (1758: 35); type locality "America *meridionali*" restricted by Thomas (1911c: 392) to Pernambuco, Brazil. Subspecies are not recognized now.

Morphological Characters and Comparisons: Measurements in tables 4 and 7 are of specimens from 5 km S of Guayaramarin (AM 209938), the río Mamoré at latitude 13°35′S (AM 211656), Puerto Caballo (AM 211657), and the río Tijamuchi 2 km from its mouth (AM 211660). Data for Ibiato in table 4 are from W. Townsend (in litt.).

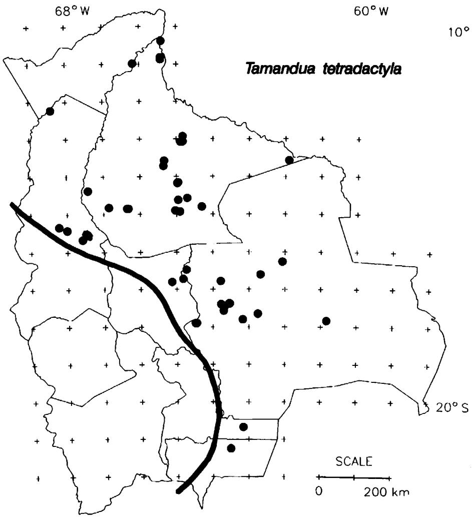


Fig. 519. Localities of known occurrence of *Tamandua tetradactyla*.

Distributional Notes: The hormiguero (= *Tamandua*, based on the text description) was reported from the province of Charcas in the department of Potosí by Chacón (1892: 208). Known localities are listed below and mapped in figure 519.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Parasitology: Fonseca (1960: 93) reported *Amblyomma* sp. (an ixodid tick) from *Tamandua tetradactyla* from Ville Montes. A flea, *Tiamastus cavicola*, was reported from Ville Montes (Smit, 1987: 232).

Scientific synonyms used for Bolivian specimens are:

Tamandua tetradactyla chapadensis: Cabrera, 1958: 204 ("Bolivia").

Tamandua tetradactyla: Eisentraut, 1933: 64 (Chaco). Lönnberg, 1943: 35 (río Beni). Fonseca, 1960: 93 (ectoparasites, Villa Montes). Wetzel, 1975: 96 (mapped many Bolivian localities but did not list them). Wetzel, 1982: 350 (ecology, map). Eisentraut, 1983: 107 (Chaco, name in list). Cabot et al., 1986: 42 (undocumented name in list). Suárez Morales, 1986: 40 (undocumented name in list). Tello, 1986: 18 (observed at Yotan, Los Palmares, and Laguna Bay). Smit, 1987: 232 (Villa Montes). Cameron et al, 1989: 69 (local reports in western Pando). Stearman, 1990: 380 (no voucher specimen; Yuquí camp at 1647/6457). Ergueta and Salazar, 1991: 20 (general summary). Emmons, 1991: 72 (seen at Calabatea in La Paz department). Anderson, 1993: 29 (general distributional records). Anderson et al., 1993: 34 (vicinity of Santa Cruz de la Sierra). Parker et al., 1993: 102 (reported by local people at Curuyuqui and Perforación). MacPhee, 1994: 29 (comparative drawings of skeletal elements, AMNH 211658, from 1456/6454).

Tamandu tetradactyla: Arce Pereira, et al., 1963: 150 (name in list; "Palmar bajo a Todos Santos").

LOCALITIES (46) AND SPECIMENS (129): **Beni:** 1023/6524, río Beni, 4 Stockholm (Lönnberg, 1942); 1049/6525, Guayaramerin, 1 AM; 1052/6525, 5 km S of Guayaramerin, 1 AM; 1256/6449, San Bartolo, 15 km N of San Joaquín, 1 FM; 1304/6449, San Joaquín, 2 FM; 1305/6453, Aserradero Monte de San Pablo, 1 MNK; 1334/6154, Remansos, 1 AM; 1343/6521, Puerto Caballo, 1 AM; 1409/6457, río Tijamuchi, 2 km from mouth, 1 AM; 1410/6458, río Tijamuchi, 5 km from mouth, 1 AM; 1422/6725, San Lorenzo, 1 Stockholm (R. M. Wetzel, personal commun.); 1434/6442, 23 km W of San Javier, 1 AM; 1437/6457, río Ibare at mouth, 2 AM; 1448/6418, Ibiato, 6 MNK (+1 CBF and 3 MNK, not seen, W. Townsend, in litt.); 1449/6651, San Borja, 1 EBD; 1451/6619, 4 km E of Los Tajibos, on road, 1 EBD; 1451/6621, Estación Biológica del Beni, 1 MSB; 1454/6502, Puerto Barador, 1 AM; 1456/6454, 20 km SE of Puerto Julio, 1 AM; 1335/6520, río Mamoré, 1 AM. **Chuquisaca:** 2041/6309, 10 km NE of Porvenir, 1 MSB. **Cochabamba:** 1643/6449, río Chimoré, 2 CBF; 1648/6508, Todos Santos, 1 AM. **La Paz:** 1520/6813, Bellavista, 1 BM; 1525/6800, Chimate, 1 BM; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 1 TTU; coordinates unknown, Mojos, 1 Stockholm (R. M. Wetzel, personal commun.); 1540/6735, Serranía Bellavista, 35 km by road N of Caranavi, 1650 m, 1 AM. **Pando:** 1059/6610, Victoria, 1 Stockholm (R. M. Wetzel, personal commun.); 1213/6824, Santa Rosa, 1 AM. **Santa Cruz:** 1615/6204, Esperanza, near Concepción, 1 BM; 1628/6444, río Ichilo, 52 km S of mouth of río Chapare, 1 AM; 1636/6241, La Laguna, 1 EBD; 1636/6241, Finca La Laguna, 9 km N of San Ramón, 1 EBD; 1647/6347, Estancia Cachuela Esperanza, 1 MSB; 1723/6332, San Miguel Rincón, 1 AM; 1723/6333, 16 km by road E of Buena Vista, 1 MSB; 1724/6346, río Yapacaní, 1 CM, 1 FM; 1727/6340, Buenavista, 4 AM, 8 ANSP, 8 BM, 4 FM, 2 MACN (not examined); 1734/6342, 3 km N and 13.5 km W of San Rafael de Amboró, río Saguayo, 1 AM; 1739/6245, 3.5 km W of Estación Pailón, 1 AM; 1748/6310, Santa Cruz de la Sierra, 2 CM, 1 FM; 1750/6050, San José de Chiquitos, 1 ZSM (R. M. Wetzel, personal commun.); 1754/6427, 4 km E of Comarapa, 1 MNK; 1754/6429, Comarapa, 1 BM. **Tarija:** 2115/6330, Villa Montes, 1 ZMB (R. M. Wetzel, personal commun.; report by Eisentraut, 1933: 64, probably from near here). **Department unknown:** perhaps Beni, 1 MNK; "Bolivia" only, 2 ANSP, 4 MNLP, 2 MACN (not seen).

ORDER CHIROPTERA

Bats are second only to rodents in species diversity among living orders of mammals. Bat species outnumber rodents in the tropical part of Bolivia. Bats are morphologically diverse in many ways but all species fly. The adaptations of bats for flight are many—the most obvious of which are their wings. The details of structure of the wings and membranes connecting the legs, wings, and tail are varied. Most present-day bats have a tail and probably the ancestors of all bats did. In some bats, the tail has been reduced or lost entirely in the course of evolution. The ears are highly varied in size, in shape, and in the form of the tragus and antitragus near the base of the notch. The nose and mouth vary from being rather plain to having elaborate folds or flaps of skin such as the nose leaf of the phyllostomids. The snout varies from blunt and short to slender and long. The teeth, tongues, and food habits are highly varied. Bolivian bats eat insects, fish, blood, smaller bats and other vertebrates, fruit, nectar, and pollen. Morphological adaptations for feeding and for flight provide many means for identifying the different taxa of bats.

A recent issue of the *Handbuch der Zool-*

ogie (Koopman, 1994) provides a useful summary of characteristics of bat taxa down to the species level and is frequently cited in the following accounts. The characters are drawn from the literature, including classic works such as Dobson (1878) and Miller (1907), as well as more recent publications and from Koopman's own experience. It should be understood that the characters noted in Koopman's accounts or in those here are not intended to provide complete technical diagnoses, to be limited to synapomorphies, or even to include all useful characters. Characters noted should be used in conjunction with the keys, tables of measurements, and maps of known distributions in arriving at reasonable identifications.

The measurements of bats included in tables 8 and 9 were taken as described earlier (Anderson, 1972: 233). The external measurements include: total length, length of tail, length of hind foot, length of tibia, length of ear, length of tragus, length of forearm, length of thumb, third finger formula (carpal length including wrist, phalanx 1, phalanx 2), and weight. Measurements are in millimeters, except weight, which is in grams.

Cranial measurements are recorded to the nearest tenth of a millimeter using an optical and mechanical system as described earlier (Anderson, 1972: 234). The measurements include condylobasal length, length of maxillary tooth row, breadth at canines, greatest dental breadth, greatest breadth of a molar, zygomatic breadth, lambdoidal breadth, breadth of braincase, interorbital breadth, postorbital breadth, and depth of braincase.

Two families of bats, in addition to those treated below, may be discovered eventually in Bolivia: Natalidae and Furipteridae. Natalids occur along the north and east coasts of South America south to São Paulo and one species, *Natalus stramineus*, was reported inland as far as Matto Grosso (Mok et al., 1982). A natalid will be recognizable by its unusually long hind limbs and tail; crown of head considerably elevated above the concave forehead; nostrils oval, close together, and near the lip; and funnel-shaped ears. Natalids tend to inhabit caves and most likely can be found in the region of the Parque Nacional "Noel Kempff Mercado" in northern Santa Cruz.

The furipterid species *Furipterus horrens* is known to occur in eastern Peru below 1000 m elevation, and might extend on southeastward into northern Bolivia. Furipterids will be recognizable by small size (30 to 40-mm forearm) and thumb reduced and enclosed in its basal membrane up to the base of a minute functionless claw. For other characters of both families see Koopman (*in* Anderson and Jones, 1984). Neither *Natalus* nor *Furipterus* has been included in the keys.

Activity and several environmental factors were shown to be related in a study of 32 bat species near Espíritu, Beni (Aguirre, 1994: 93). Generally, the amount of activity, as measured by numbers of bats netted, was less when there was more moonlight, more rain, or greater wind intensity. North winds, which tend to be warmer, were more favorable to bat activity than south winds. Data are limited for most species and so details are not included in the individual species accounts.

CONSERVATION STATUS: No Bolivian species of Chiroptera is regarded as endangered or threatened under CITES.

FAMILY EMBALLONURIDAE

Gervais *in* Castelnau, 1855: 62

MORPHOLOGICAL CHARACTERS AND COMPARISONS: The emballonurid bats now known from Bolivia belong to the subfamily Emballonurinae, but the other subfamily, the Diclidurinae, may be discovered there later, most likely in the northern lowlands. The nominal subfamily occurs in the tropics of both the Old and the New World, the Diclidurinae in the New World only. The nose lacks a nose leaf and in some species is quite pointed. Emballonurids are known as sheath-tailed or sac-winged bats, the latter after a glandular sac present on wings of most species. The end of the tail extends freely above the interfemoral membrane at a position well away from its back edge.

Eventually other emballonurid genera may be discovered to occur in northern Bolivia. The possible occurrence of *Cormura brevirostris* may be postulated on the basis of its known occurrence in the Madre de Dios region in Peru west of Bolivia (Koopman, 1978) and in the Matto Grosso region of Brazil east of Bolivia (Sanborn, 1937). *Diclidurus albus* is known from Porto Velho, Brazil, about 120 km from Bolivia to the north (Vieira, 1955: 357) and might possibly extend into Bolivia.

Genus *Peropteryx* Peters, 1867

These little bats resemble *Saccopteryx* but lack their dorsal stripes. The opening of the wing pouch is near the front border of the leading wing membrane and the pouch is quite small in females. In the subgenus *Peropteryx*, to which both of the Bolivian species belong, the rostrum is much swollen anteriorly, its dorsal profile nearly parallel with the maxillary tooth row; the lateral pterygoid pits are small; and ears are separate (Koopman, 1994: 47).

Peropteryx kappleri Peters, 186

Peters Sac-winged Bat

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Peropteryx Kappleri* was described by Peters (1867: 473), type locality "Surinam." A subspecies name that may be applicable to Bolivian specimens is *P. kappleri intermedius* Sanborn (1951: 476), type locality Hacienda Cadena, Quispicanchis, Cuzco department, Peru.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Forearm length is 45–54 mm; total length of skull, 16–18 mm); wing entirely black (Koopman, 1994: 47). Measurements in tables 8 and 9 are from Aguirre and Urioste (1994: 71). Forearm length, weight, and cranial measurements are means.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 520.

HABITS: The only specimen taken in a study by Aguirre (1994: 89) at Espíritu was netted between 1800 and 2000 hours.

No data for Bolivia are available on habitat, behavior, food, or reproduction.

The only scientific name used for Bolivian specimens is:

Peropteryx kappleri: Aguirre, 1994: 48 (isla de bosque Espíritu Viejo). Aguirre and Urioste, 1994: 72 (Espíritu, San Miguel).

LOCALITIES (2) AND SPECIMENS (5): **Beni:** 1411/6638, near Espíritu, 1 (Aguirre, 1994: 48). **Pando:** 1140/6743, San Miguel, 4 CBF.

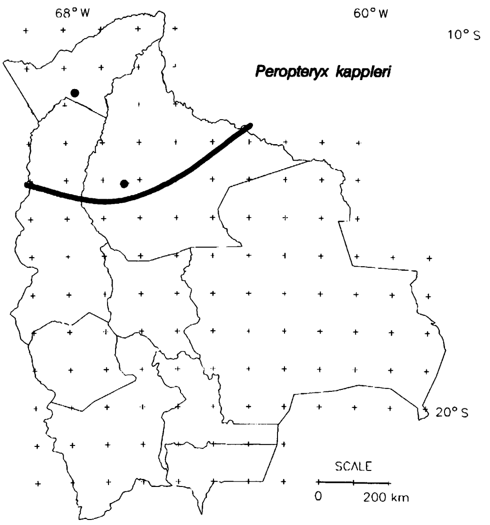


Fig. 520. Localities of known occurrence of *Peropteryx kappleri*.

Peropteryx macrotis (Wagner), 1843

There is no truly vernacular name for this species.

TAXONOMIC REMARKS: The name used for the species has its type locality outside of Bolivia. *Emballonura macrotis* was described by Wagner (1843: 367), type locality Mato Grosso, restricted by Carter and Dolan (1978: 20) to "Cuyaba (Cuiaba)."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Forearm length is 38–49 mm; total length of skull is 12–15 mm; wing entirely black (Koopman, 1994: 47). Measurements in tables 8 and 9 are of specimens from Versalles (AM 209227—209229). The weight of a specimen from the río Mamoré at 12°26′S (AM 210516) was 8.4 g.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 521.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

PARASITOLOGY: Brennan (1970: 811) reported two species of chigger, *Hooperella saccopteryx* and *Perissopalla* nr. *tanycera*, both from Versalles.

Scientific synonyms used for Bolivian specimens are:

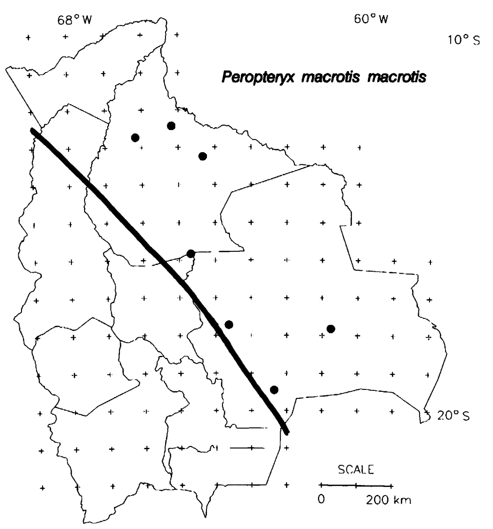


Fig. 521. Localities of known occurrence of *Peropteryx macrotis macrotis*.

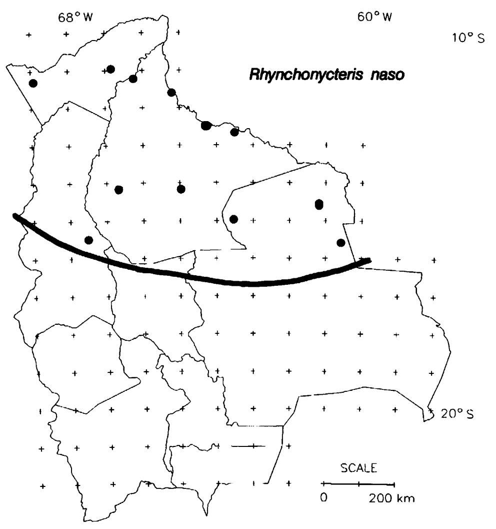


Fig. 522. Localities of known occurrence of *Rhynchonycteris naso*.

Peropteryx macrotis macrotis
(Wagner), 1843

Peropteryx macrotis macrotis: Anderson et al., 1982: 2. Barquez, 1983b: 185 (San José de Chiquitos). Anderson, 1985b: 6 (name in list).

Peropteryx macrotis: Brennan, 1970: 811 (chiggers, Versalles). Barquez, 1984a: 214 (San José de Chiquitos). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Ibáñez and Ochoa, 1989: 219 (Hacienda Cerro Colorado). Wilson and Salazar, 1990: 47 (in list for Estación Biológica del Beni). Anderson, 1993: 20 (general distributional records). Anderson et al., 1993: 19 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (7) AND SPECIMENS (16): **Beni:** 1226/6511, río Mamoré, 3 AM; 1244/6610, Versalles, 3 AM; 1315/6420, Piedras Blancas, 4 MNK; 1550/6441, río Mamoré, 5 km NW of mouth of río Grande, 1 AM. **Santa Cruz:** 1743/6338, río Pitisama, Amboró, 1 MNK; 1749/6045, San José de Chiquitos, (Barquez, 1983b), 2 IML; 1927/6221, Hacienda Cerro Colorado, 2 EBD.

Genus *Rhynchonycteris* Peters, 1867

Dental formula i1/3, c1/1, p2/2, m3/3, total 32. "Postorbital process long, curved, and slender, not obscured by supraorbital ridges [as in the Diclidurinae]. No wing sacs .... Anterior upper premolar flat and triangular. Basisphenoid pits deep and coalesced. Muzzle extending anterior to incisors" (Koopman, 1994: 45). The genus includes only one species.

Rhynchonycteris naso
(Wied-Neuwied), 1820

Sharp-nosed Bat or Murciélago de Trompa

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Vespertilio Naso* was described by Wied-Neuwied (1820: 251), type locality "Die Ufer des Mucuri" [= río Mucuri], state of Minas Gerais, Brazil. Peters (1867: 477) used the name *Rhynchonycteris naso*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: This is a small bat with mottled grayish fur that extends as a series of tufts along the forearm. There is no glandular wing sac. The nose is narrowly pointed (though not the skull). Measurements in tables 8 and 9 are of specimens from three localities on the río Iténez near Costa Marquez (AM 209208–209210, 209201–209202, 209212—209215).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 522.

HABITAT: These bats frequent river courses at low elevations. When resting on the trees they resemble small dark knobs of bark.

HABITS AND BEHAVIOR: They are somewhat diurnal and gregarious. When alarmed by the approach of a canoe they fly in small flocks over the water from one tree trunk to another. The only specimen taken in a study by Aguirre (1994: 89) at Espíritu was netted between 2200 and 2400 hours.

FOOD: One stomach contained remains of Lepidoptera (Aguirre, 1994: 83). No other Bolivian data are available.

REPRODUCTION: A female in August had one embryo. One in September was recorded as having no embryos.

Scientific synonym used for Bolivian specimens is:

Rhynchonycteris naso: Webster and Jones, 1980: 2 (a specimen from Tomonoco in La Paz). Anderson et al., 1982: 2. Anderson and Webster, 1983: 2 (río Nareuda, Tumichucua). Webster and Fugler, 1984: 15 (Tumichucua, Tomonoco). Anderson, 1985b: 6 (name in list). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Ibáñez and Ochoa, 1989: 219 ("near" La Florida). Wilson and Salazar, 1990: 47 (in list for Estación Biológica del Beni). Emmons and Feer, 1990: 45 (mentioned Bolivia). Emmons and Smith, 1992 (Ingavi). Plumpton and Jones, 1992 (summary for species). Anderson, 1993: 20 (general distributional records). Aguirre, 1994: 47 (Arroyo Carnaval near Espíritu).

LOCALITIES (17) AND SPECIMENS (55): **Beni:** 1113/6614, Tumichucua, 3 LSU; 1136/6512, 6 km S of Buena Hora [Brazil], at Arroyo Mercedes, 7 AM; 1229/6415, río Iténez, about 4 km above Costa Marques [Brazil] 7 AM; 1229/6417, río Iténez, opposite Costa Marques, 2 AM; 1229/6418, río Iténez, 1.5 km below Costa Marques, 1 AM; 1230/6415, Pampa de Meio, 4 AM; 1230/6418, mouth of río Baures, 16 AM; 1240/6330, mouth of río Curiche, 1 AM; 1410/6640, Carnaval, 1 (Aguirre, 1994: 47); 1410/6458, río Tijamuchi, 4 km from mouth, 1 AM. **La Paz:** 1529/6731, Tomonoco, 1 mi [= 1.6 km] W of Puerto Linares, 1 TTU. **Pando:** 1057/6650, Ingavi, 1 CBF (Emmons and Smith, 1992); 1117/6855, río Nareuda, 2 AM. **Santa Cruz:** 1433/6111, Aserradero Moira, 5 EBD; 1436/6111, "near" La Florida, 1 (Ibáñez and Ochoa, 1989); 1458/6332, Pajaral, 1 MNK; 1535/6034, Flor de Oro, 1 MNK.

Genus *Saccopteryx* Illiger, 1811

The fur is blackish or brown and two parallel whitish or yellowish lines run down the back, one on each side. The ears are separate, narrow, tall, and round tipped. Dental formula i1/3, c1/1, p2/2, m3/3, total 32. "Postorbital processes long, curved, and slender, not obscured by supraorbital ridges [as in Diclidurinae]. Wing sac (particularly evident in males) close to forearm near elbow. Clavicle not expanded [expanded only in *Diclidurus* and *Cyttarops*]. Tibia without a longitudinal groove [same comment as for clavicle]. Anterior root of zygoma so expanded that upper molars and premolars are hidden in dorsal view. Anterior upper premolar a structureless spicule. Interpterygoid fossa strongly narrowed anteriorly, the palate without a median projection. Upper surface of rostrum flat and narrow. Premaxillaries well developed dorsally. Lateral pterygoid pits small" (Koopman, 1994: 46). The skull has a distinct midsagittal crest.

These bats often hide in hollow trees by day and may fly relatively early at dusk and also near dawn.

Saccopteryx bilineata (Temminck), 1838

White-lined Bat or Murcielago Rayado

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Urocryptus bilineatus* was described by Temminck (1838: 33), type locality Surinam. Peters (1867: 471) used the name *Saccopteryx bilineata*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Forearm length is 41–51 mm; free edge of plagiopatagium attached to tibia; two longitudinal whitish lines on blackish back (Koopman, 1994: 46). Measurements in tables 8 and 9 are of specimens from the río Mamoré (AM 210489–210502) and from Versalles (AM 209217–209223). The heaviest individuals were pregnant females. The heaviest male weighed 10 g.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 523.

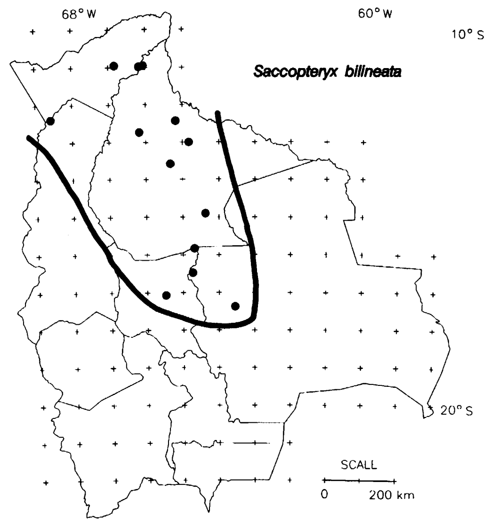


Fig. 523. Localities of known occurrence of *Saccopteryx bilineata.*

No data for Bolivia are available on habitat, habits, behavior, or food.

REPRODUCTION: Pregnant females, each with one embryo, were found in August (1), September (2), and October (9). The only other month sampled was July and only six females, none pregnant, were taken then.

Scientific synonym used for Bolivian specimens is:

Saccopteryx bilineata: Sanborn, 1937: 329 (two specimens from río Palometillas). Ibáñez: 1981, 32 (mapped one locality in Santa Cruz). Anderson et al., 1982: 2. Anderson, 1985b: 6 (name in list). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Wilson and Salazar, 1990: 47 (in list for Estación Biológica del Beni). Patterson, 1992: 9 (Victoria). Emmons and Smith, 1992 (Ingavi). Anderson, 1993: 20 (general distributional records). Anderson et al., 1993: 19 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (15) AND SPECIMENS (75): **Beni:** 1226/6511, río Mamoré 13 AM; 1244/6610, Versalles, 7 AM; 1300/6449, Aguadulce, 1 FM; 1335/6520, río Mamoré, 14 AM; 1454/6422, 6 km W of Casarabe, 5 AM; 1550/6441, río Mamoré, 5 km NW of mouth of río Grande, 17 AM; coordinates unknown, Campamento Chiman Libertad, 2 MNLP. **Cochabamba:** 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 1 AM. **Pando:** 1057/6603, left bank of río Beni, 1 AM; 1057/6650, Ingavi, 1 CBF (Emmons and Smith, 1992); 1059/6610, Victoria, 4 (Patterson, 1992: 9); 1223/6835, Chivé, 1 MNLP; 1223/6835, Isla Gargantua, 1 MSB. **Santa Cruz:** 1628/6444, río Chapare, about 52 km S of its mouth, 3 AM; 1722/6333, río Palometillas, in province of Sara, 2 FM.

Saccopteryx leptura (Schreber), 1774

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Vespertilio lepturus* was described by Schreber (1774, plate 57), type locality "Surinam." Illiger (1811: 121) used the name *Saccopteryx lepturus* and Peters (1867: 471) used *Saccopteryx leptura.*

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Forearm length is 37–43 mm; maxillary tooth row length is 5.8–6.2 mm; free edge of the plagiopatagium attached to tibia; two longitudinal whitish lines on brown back (Koopman, 1994: 46). Measurements in tables 8 and 9 are of specimens from the west bank of the río Beni opposite Hamburgo (AM 262418), the bank of the río Iténez opposite Costa Marques (AM 209225–209226), and the río Mamoré at 12°26′S (AM 210514). The greatest total length recorded was 72 mm, but this was of a young animal, so there is probably overlap in at least some of the measurements between *S. leptura* and the larger *S. bilineata.*

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 524.

No data for Bolivia are available on habitat, habits, behavior, or food.

Scientific synonym used for Bolivian specimens is:

Saccopteryx leptura: Anderson et al., 1982: 2. Anderson, 1985b: 6 (name in list). Emmons and Smith, 1992 (Ingavi). Anderson, 1993: 20 (general distributional records).

LOCALITIES (3) AND SPECIMENS (12): **Beni:** 1226/6511, río Mamoré, 9 AM; 1229/6417, río Iténez, opposite Costa Marques [Brazil], 2 AM. **Pando:** 1101/6606, W bank río Beni, opposite Hamburgo, 1 AM.

FAMILY NOCTILIONIDAE GRAY, 1821

"No noseleaf, but muzzle pointed with a projecting pad. Full lips forming definite

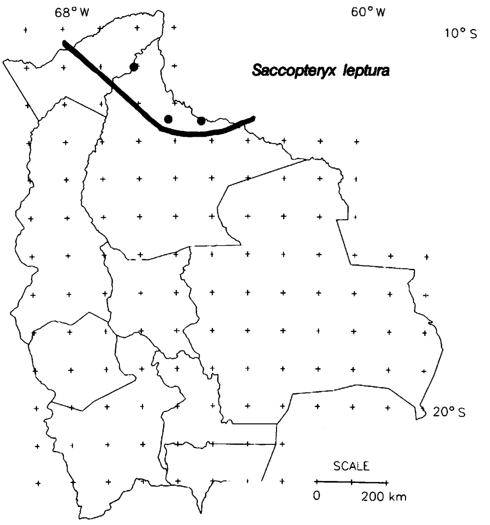


Fig. 524. Localities of known occurrence of *Saccopteryx leptura.*

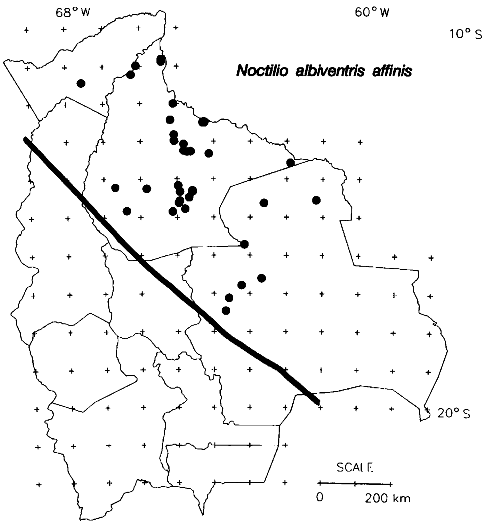


Fig. 525. Localities of known occurrence of *Noctilio albiventris affinis.*

cheek pouches. Orifice of mouth transverse. Nares opening anteriorly and somewhat tubular . . .. Fibula threadlike and cartilaginous proximally. Foot with greatly developed bony calcar supported by enlarged, distally expanded, flattened calcaneum" (Koopman, 1994: 69). The only genus is *Noctilio.*

Genus *Noctilio* Linnaeus, 1766

These "bull-dog bats" or "hare-lipped bats" are relatively large and have pointed ears and full lips. The hind leg, and especially the foot, is unusually large. The tail is more than half as long as the femur and reaches the middle of the membrane. The skull is short and deep, and it has a high median bony crest on the braincase. There are no postorbital processes, such as occur in emballonurids. The muzzle is high and the palate is concave from side to side. The mastoid processes are prominent and the bullae are small. The dental formula has been reduced to the following: i2/1, c1/1, p1/2, m3/3, total 28. Most of the teeth that are present are relatively large. There are only two species.

Noctilio albiventris Desmarest, 1818

Lesser Fishing Bat

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Noctilio albiventris* was described (and attributed to Geoffroy) by Desmarest (1818: 15, type locality Rio São Francisco, Bahia, Brazil). A subgenus *Dirias* of Miller, 1904, has been recognized for this species, but I am inclined to regard this as redundant and superfluous, because each of the two subgenera thus recognized includes only one species.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Length of tibia and foot together is less than half length of leg (Koopman, 1994: 70). Measurements in tables 8 and 9 are of specimens from 4 km above Costa Marques (AM 209243—209252), opposite Costa Marques (AM 209239), and 38 km W of Trinidad (AM 260866, 260947–260952).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 525.

HABITAT: Roosting sites in hollows of trees were reported by Aguirre (1994: 95) near Espíritu, Beni. Sites were shared with *Molossus molossus* in some cases.

HABITS: In a study by Aguirre (1994: 89) at Espíritu and during the first 6 hours of darkness, most individuals were netted in the first 2 hours, between 1800 and 2000.

No data for Bolivia are available on habitat or behavior.

FOOD: Most studies of the diet have reported this species to be primarily insectivorous (Hood and Pitochelli, 1983). In September 1964, I took two specimens from the lower part of a mist net over a sandbar in the río Iténez in the early morning and observed two small fish lying on the sand beneath the bats. I concluded that the bats had caught and were transporting these fish when they hit the net, and this supports the idea that the diet at times includes fish as well as insects. The contents of eight stomachs from Espíritu, Beni, were studied by Aguirre (1994: 83). Eight orders and 18 families of insects were represented, a greater variety than he found in any of the other 15 insectivorous species of bats studied. The 95 measureable food items varied in size from less than 5 to more than 20 mm, with most in the lower half of this range (Aguirre, 1994: 87).

REPRODUCTION: Females, each with one embryo, were recorded in August (1), September (2), October (1), and November (1). Females with no embryo were recorded in August (1), September (1), and December (3).

Scientific synonyms used for Bolivian specimens are:

Noctilio albiventris affinis
d'Orbigny, 1837

Noctilio affinis d'Orbigny, 1837 [year given by Sherborn and Griffin, 1934, for this plate], plate 10, fig. 1 (type locality "province de Moxos," perhaps in Beni, and Concepción in Santa Cruz). D'Orbigny and Gervais, 1847: 12 (Concepción).

Noctilio albiventer: Dobson, 1878: 398 (Bolivia).

Noctilio albiventris affinis: Davis, 1976: 702 (31 specimens). Ibáñez, 1981: 50 (map). Anderson et al., 1982: 2. Anderson and Webster, 1983: 2 (Tumichucua). Myers and Wetzel, 1983: 9 (discuss uncertainty of subspecies status). Hood and Pitochelli, 1983: 1 (general information on species). Webster and Fugler, 1984: 15 (Guayaramerin, Tumichucua). Anderson, 1985b: 6 (name in list). Anderson, 1993: 20 (general distributional records). Anderson et al., 1993: 20 (vicinity of Santa Cruz de la Sierra).

Noctilio labialis: Yunker and Radovsky, 1980: 549 (San Ramón and San Joaquín).

Noctilio albiventris: Barquez, 1984a: 215 (río Cucharca). Ibáñez, 1985: 331 (La Laguna). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Ibáñez and Fernandez, 1989: 19 (Trinidad de Moxos). Wilson and Salazar, 1990: 48 (río Curiraba). Barquez and Ojeda, 1992: 242 (mention specimens from Beni). Aguirre, 1994: 48 (six localities near Espíritu).

LOCALITIES (41) AND SPECIMENS (522): **Beni:** 1049/6525, Guayaramarin, 1 AM, 2 (Webster and Fugler, 1984); 1052/6525, 5 km S Guayaramarin, 1 AM; 1059/6606, Riberalta, province of Vaca Diez, 1 US (not examined); 1113/6614, Tumichucua, 2 LSU; 1200/6506, Puerto Moré, 8 AM; 1226/6511, río Mamoré, 3 AM; 1229/6415, 4 km above Costa Marquez [Brazil], on río Iténez, 10 AM; 1229/6417, río Iténez, opposite Costa Marquez, 6 AM; 1230/6415, Pampa de Meio, 1 AM; 1230/6418, mouth of río Baures, 2 AM; 1249/6505, mouth of río Matucare, 2 AM; 1259/6505, 22 km S of Puerto Siles, 10 AM; 1304/6449, San Joaquín, 85 FM, 1 (Yunker and Radovsky, 1980); 1315/6449, Totai, 4 FM; 1315/6449, Yutiole, 11 FM; 1316/6438, San Ramón, 10 MSB; 1317/6443, San Ramón, 10 FM, 3 (Yunker and Radovsky, 1980); 1320/6408, Magdalena, 4 AM, 83 US (not examined); 1334/6154, Remansos, 1 km below mouth of río Paragua, 40 AM; 1413/6640, Espíritu and vicinity, 39, (Aguirre, 1994: 48); 1410/6458, río Tijamuchi, 4 km from mouth, 2 AM; 1415/6550, Venecia, 3 EBD (not seen); 1418/6435, río Cucharca, 4 (Barquez, 1984); 1420/6435, Santa Rosa, río Cucharca, 2 IML; 1420/6455, 10 km W of San Pedro, 1 AM; 1429/6440, San Juan, 2 IML; 1434/6455, 23 km W of San Javier, 123 AM; 1437/6457, mouth of río Ibare, 3 AM; 1447/6447, Trinidad de Mojos, 1 BM, 1 Madrid; 1450/6623, río Curiraba, 2 CBF, 2 US; 1451/6507, 38 km by road W of Trinidad, 8 AM, 1 MNLP; coordinates unknown, Laguna Bolivia, 5 CBF. **Cochabamba:** coordinates unknown, Campamento II (Univ. Cochabamba), 1 MNK. **Pando:** 1126/6734, Independencia, 1 AM, 1 MSB. **Santa Cruz:** 1433/6111, Aserradero Moira, 1 EBD; 1438/6237, Perseverencia, 1 MNK; 1543/6309, 6 km by road W of Ascención, 1 AM, 1 MSB; 1636/6241, La Laguna, 9 km N of San Ramón, 1 EBD; 1647/6314, Estancia Cachuela Esperanza, 1 AM, 2 MSB; 1707/6335, Santa Rosa de Sara, 1 EBD (not seen); 1727/6340, Buenavista, 8 FM (not examined), 1 BM. **Department unknown:** coordinates unknown, "Bolivia" only, 2 BM (one seen).

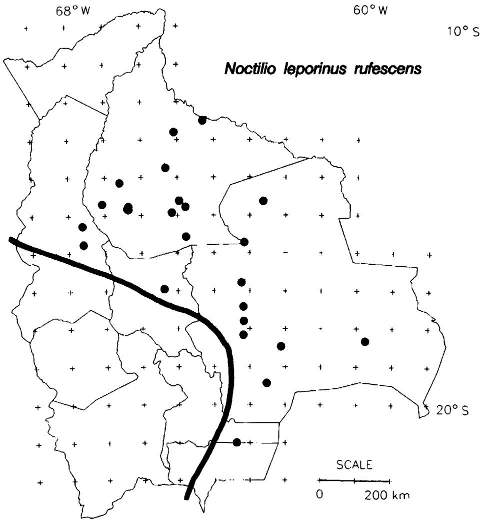


Fig. 526. Localities of known occurrence of *Noctilio leporinus rufescens.*

Noctilio leporinus (Linnaeus), 1758

Greater Fishing Bat

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Vespertilio leporinus* was described by Linnaeus (1758: 32); type locality "America", restricted by Thomas (1911c: 131) to Surinam. Olfers (*in* Eschwege, 1818: 225) described *N*[*octilio*]? *rufescens,* type locality Paraguay.

Morphological Characters and Comparisons: The length of tibia and foot together is more than half length of leg (Koopman, 1994: 70). Measurements in tables 8 and 9 are of specimens from 8 km SE of Tita (AM 260048), 45 km N of Yacuma (AM 261371, 261372), río Tijamuchi (AM 261369), and Sararia (UM 126696).

Distributional Notes: Known localities are listed below and mapped in figure 526.

Habits: In a study by Aguirre (1994: 89) at Espíritu and during the first 6 hours of darkness, one individual was netted in each two hour interval.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Noctilio leporinus rufescens
Olfers, 1818

Noctilio rufipes d'Orbigny, 1837 [year given by Sherborn and Griffin, 1934, for this plate], plate 9, figs. 1–4 (type locality río San Miguel, Llanos de Guarayos).

Noctilio leporinus: d'Orbigny and Gervais, 1847: 12 (from "les grandes forets qui bordent le Rio de San-Miguel, au pays des sauvages Guarayos"). Sanborn, 1932a: 172 (specimen from Santa Cruz de la Sierra). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Ibáñez and Ochoa, 1989: 219 (Guirapembi). Wilson and Salazar, 1990: 48 (Estación Biológica del Beni). Aguirre, 1994: 49 (isla de bosque Espíritu Viejo).

Noctilio leporinus rufipes: Cabrera, 1938: 6; 1958: 57. Hershkovitz, 1987b: 74 (Chiquitos and Moxos).

Noctilio leporinus rufescens: Davis, 1973: 873 (5 specimens). Ibáñez, 1981: 57 (map). Anderson et al., 1982: 3. Myers and Wetzel, 1983: 10. Webster and Fugler, 1984: 15 (Caranavi). Hood and Jones, 1984: 1 (general information on species). Anderson, 1985b: 6 (name in list). Anderson, 1993: 20 (general distributional records). Anderson et al., 1993: 20 (vicinity of Santa Cruz de la Sierra).

Localities (26) and Specimens (50): **Beni:** 1230/6418, mouth of río Baures, 1 AM; 1248/6505, Puerto Siles, 1 AM; 1345/6519, río Apere, 5 km from mouth, 1 AM; 1406/6622, near Espíritu, 3 (Aguirre, 1994: 49); 1437/6457, mouth of río Ibare, 1 AM; 1442/6704, 45 km N of Yacuma, 2 AM; 1446/6621, Campamento La Pascana, 7 MNLP, 1 IE; 1447/6447, Trinidad, 1 MSU (not examined); 1450/6623, Arroyo Curiraba, 2 IE; 1451/6621, río Curiraba, Estación Biológica del Beni, 1 CBF, 2 US; 1456/6509, río Tijamuchi, 2 AM, 3 MSB; 1534/6446, 15 km S of Limoquije, 1 AM. **Cochabamba:** 1657/6523, Las Pozas, Villa Tunari, 1 EBD (not seen); **La Paz:** coordinates unknown, río Medidi, 1 BM (not seen); 1517/6737, Sararia, 1 UMMZ; 1546/6736, Caranavi, 1 MSU. **Santa Cruz:** 1438/6237, Perseverencia, 1 MNK; 1543/6309, 6 km by road W of Ascención, 1 MSB; 1647/6314, Estancia Cachuela Esperanza, 1 AM; 1725/6311, 10 km S of Montero, 2 MSB, 1 Hayward coll.; 1748/6310, Santa Cruz de la Sierra, 1 CM; 1810/6311, 10 km E of Ingeniero Mora, 7 MSU (5 not examined); 1820/5945, Roboré, 1 MSB; 1828/6207, 8 km SE of Tita, 1 AM; 1926/6231, Guirapembi, (Ibáñez and Ochoa, 1989). **Tarija:** 2100/6323, 1 km S of Camatindi, 1 CBF.

FAMILY MORMOOPIDAE KOCH, 1862–1863

"Rostrum tilted upward to a greater or lesser degree. Trochiter of humerus well-developed, but not contacting scapula. Palatal branches of premaxillaries well-developed. Noseleaf represented only by a naso-labial plate, lower lip with plate-like outgrowths .... Foot lacking special modifications. Tail well-developed, extending approximately to middle of uropatagium" (Koopman, 1994: 70). The only genus represented in Bolivia is *Pteronotus*. Each of the three species known from Bolivia has been placed in a separate subgenus.

Genus *Pteronotus* Gray, 1838

Dental formula i2/2, c1/1, p2/3, m3/3, total 34, but middle lower premolar greatly reduced and more or less excluded lingually from the toothrow. "Rostral portion of skull only slightly elevated .... Ears relatively long and pointed, not united by a pronounced band. Tragus relatively simple" (Koopman, 1994: 70).

Subgenus *Chilonycteris* Gray, 1839

"Inner edges of plagiopatagium attached to sides of body. Rostral breadth equal to or less than maxillary toothrow length. Basioccipital not constricted between periotics. Basisphenoid with two wide shallow furrows" (Koopman, 1994: 71).

Pteronotus personatus (Wagner), 1843

Mustached Bat

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Chilonycteris personata* was described by Wagner (1843: 367), type locality São Vicente, Mato Grosso, Brasil. Vaughan and Bateman (1970: 218) used the name *P*[*teronotus*]. *personatus*.

Morphological Characters and Comparisons: "Size medium (forearm length, 40–49 mm; condylobasal length, 13–16 mm)" (Koopman, 1994: 71). Measurements in tables 8 and 9 are of a specimen from Venezuela (AM 32128).

Distributional Notes: Known in Bolivia from only one locality (fig. 527).

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms relevant to the Bolivian specimen are:

Pteronotus personatus personatus (Wagner, 1843)

Pteronotus personatus: Ibáñez and Ochoa, 1989: 216 (38 km E of La Florida).
Pteronotus personatus personatus: Anderson, 1993: 21 (cited Ibáñez and Ochoa).

Specimens, 1. **Santa Cruz:** 1436/6053, 38 km E of La Florida, 1 EBD.

Subgenus *Phyllodia* Gray, 1843

"Inner edges of plagiopatagia attached to sides of body. Rostral breadth equal to or less than maxillary toothrow length. Basioccipital relatively constricted between periotics. Basisphenoid with two narrow deep furrows" (Koopman, 1994: 70).

Pteronotus parnellii (Gray), 1843

Mustached Bat

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Phyllodia Parnellii* was described by Gray (1843: 50), type locality Jamaica. *Chilonycteris rubiginosa* was described by Wagner (1843: 367), type locality Caiçara, Mato Grosso, Brazil. Smith (1972: 63) used the name *Pteronotus parnellii rubiginosus*.

Morphological Characters and Comparisons: Forearm length is 48–66 mm; condylobasal length is 16–22 mm (Koopman, 1994: 70). Measurements in tables 8 and 9 are of a specimen from Venezuela (AM 260001).

Distributional Notes: Known in Bolivia from three localities in one small area, mapped in figure 527.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

Scientific synonym used for Bolivian specimens is:

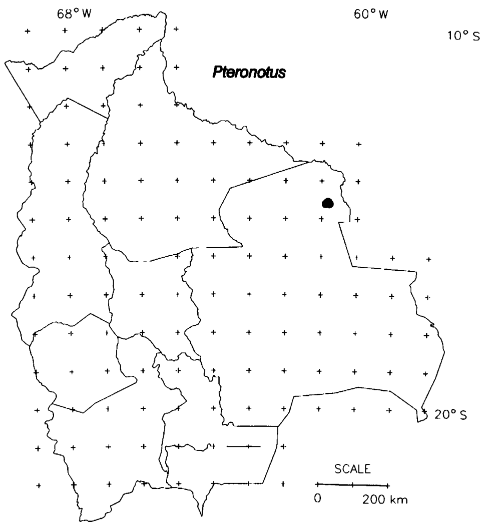


Fig. 527. Localities of known occurrence of the genus *Pteronotus*. *Pteronotus* (*Chilonycteris*) *personatus personatus*, *Pteronotus* (*Phyllodia*) *parnellii rubiginosus*, and *Pteronotus* (*Pteronotus*) *gymnonotus* are all known from one or more of the clustered localities mapped.

Pteronotus parnellii rubiginosus (Wagner, 1843)

Pteronotus parnellii rubiginosus: Ibáñez and Ochoa, 1989: 216 (50 km E and 38 km E of La Florida). Anderson, 1993: 21 (cited Ibáñez and Ochoa).

LOCALITIES (3) AND SPECIMENS (3): **Santa Cruz:** 1433/6049, 17 km S of Campamento Los Fierros, 1 AM; 1436/6047, 50 km E of La Florida, or km 55 E of Aserradero, 1 EBD; 1436/6053, 38 km E of La Florida, or Los Fierros, 1 EBD.

Subgenus *Pteronotus* Gray, 1838

"Inner edges of plagiopatagia attached to middorsal line. Rostral depth greater than maxillary toothrow length. Basioccipital not constricted between periotics. Basisphenoid with two oval pits" (Koopman, 1994: 71).

Pteronotus gymnonotus (Natterer *in* Wagner), 1843

Greater Naked-backed Bat

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Chilonycteris gymnonotus* was described by Natterer (*in* Wagner, 1843: 367), type locality Cuiabá, Mato Grosso, Brasil. Smith (1977: 246) used the name *Pteronotus gymnonotus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Forearm length is 49–56 mm; condylobasal length is 15–17 mm (Koopman, 1994: 71). Measurements in tables 8 and 9 are of a specimen from Venezuela (AM 32085).

DISTRIBUTIONAL NOTES: Known in Bolivia from only one locality, mapped in figure 527.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

Scientific synonym relevant to the Bolivian specimen is:

Pteronotus gymnonotus: Ibáñez and Ochoa, 1989: 216 (38 km E of La Florida). Anderson, 1993: 21 (use of current name).

Specimen, 1. **Santa Cruz:** 1436/6053, 38 km E of La Florida, or Los Fierros, 1 EBD.

FAMILY PHYLLOSTOMIDAE GRAY, 1825

These are the New World leaf-nosed bats. "Rostrum not tilted upward relative to the braincase [as in Mormoopidae]. Trochiter of humerus well-developed and making contact with scapula. Palatal branches of premaxillaries well-developed. A true noseleaf almost always present, at least as represented by a more or less circular nosepad and usually with an upright portion as well" (Koopman, 1994: 72). See Baker et al. (1989) for discussion of relationships of the Phyllostomidae. The arrangement of subfamilies here follows Koopman (*in* Wilson and Reeder, 1993).

SUBFAMILY PHYLLOSTOMINAE GRAY, 1825

"Upper incisors and canine not bladelike [as in true vampires]. Noseleaf well developed with a prominent upright portion. Tongue not [as in Glossophaginae] elongate, lacking conspicuous bristle-like papillae; musculature exhibits a transverse pattern in section, supplied by paired longitudinal arteries. Anterior upper premolar in contact with canine and with posterior upper premolar. Zygomatic arch complete. Upper molars dilambdodont with a distinct W-shaped ectoloph" (Koopman, 1994: 72).

Genus *Chrotopterus* Peters, 1865b: 505

Dental formula i2/2, c1/1, p2/3, m3/3, total 34. "Molars narrowed with considerable distortion of cusp pattern. Rostrum as long as braincase. Uropatagium broad" but tail greatly reduced (Koopman, 1994: 76). The genus includes only one species.

Chrotopterus auritus (Peters), 1856

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Vampyrus auritus* was described by Peters (1856a: 415); type locality "Mexico" corrected to Santa Catarina, Brazil, by Carter and Dolan (1978: 37). *Chrotopterus auritus australis* was described by Thomas (1905: 308), type locality Concepción, Paraguay. He distinguished *C. a. australis* from the northern *C. a. guianae* on the basis of reduced white tipping to wings, "the terminal phalanx of third digit only whitened, and the membrane only lighter, not white, for about half an inch at the tip; no whitish line extending along the hinder edge of the wing-membrane beyond the end of the fourth digit." Alludes also to difference in distribution of fur, in *C. a. australis* "base of thumb with a distinct patch of woolly fur on the metacarpus. Fur of body extending on to the wing-membrane behind the elbows below, and on the interfemoral membrane above the thighs and knees." In *C. a. guianae* the "base of thumb almost without hairs. Fur of body and forearms not extending on to the membranes, which are practically naked throughout."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 8 and 9 are of specimens from 4 km above Costa Marques (AM 209353), 4.5 km N and 1.5 km E of Cerro Amboró (AM 261373), and 14.5 km NW of Masicuri (AM 260867).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 528.

HABITS: In a study during the first 6 hours of darkness at Espíritu, Beni (Aguirre, 1994: 89), the only specimen was captured between 2200 and 2400.

No data for Bolivia are available on habitat, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

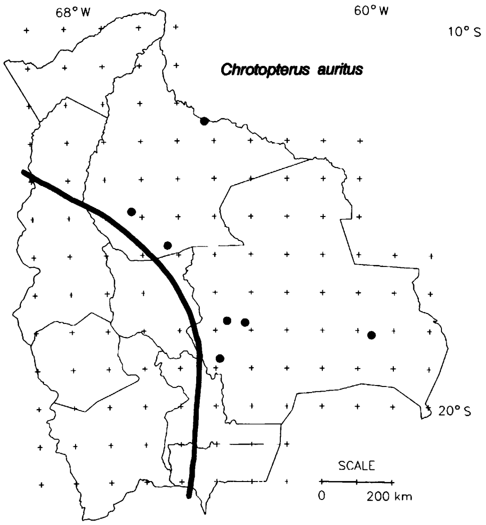


Fig. 528. Localities of known occurrence of *Chrotopterus auritus*.

Chrotopterus auritus australis: Anderson et al., 1982: 4 (specimen noted below). Anderson, 1985b: 7 (name in list). Medellín, 1989: 2 (general information on the species, map). Anderson, 1993: 22 (general distributional records). Anderson et al., 1993: 21 (vicinity of Santa Cruz de la Sierra).

Chrotopterus auritus: Wilson and Salazar, 1990: 49 (río Matos). Emmons and Feer, 1990: 61 (mentioned Bolivia). Koopman, 1994: 77 (did not recognize subspecies). Aguirre, 1994: 53 (individual observed in a net at the arroyo Carnaval near Espíritu, 1410/6640).

LOCALITIES (7) AND SPECIMENS (7): **Beni:** 1229/6415, río Iténez, 4 km above Costa Marques [Brazil], 1 AM; 1451/6617, río Matos, 1 US; 1545/6523, Puerto San Lorenzo on río Sécure, 1 CBF. **Santa Cruz:** 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 1 AM; 1748/6310, Santa Cruz (assumed to be the city), 1 MACN (not examined); 1807/5937, 24 km by road N of Santiago de Chiquitos, on río Tucavaca, 1 AM; 1845/6353, 14.5 km by road NW Masicuri, 1 AM.

Genus *Lonchorhina* Tomes, 1863

Dental formula i2/2, c1/1, p2/3, m3/3, total 34. "Middle lower premolar greatly reduced and may be displaced lingually from the toothrow. Rostrum shorter than braincase.

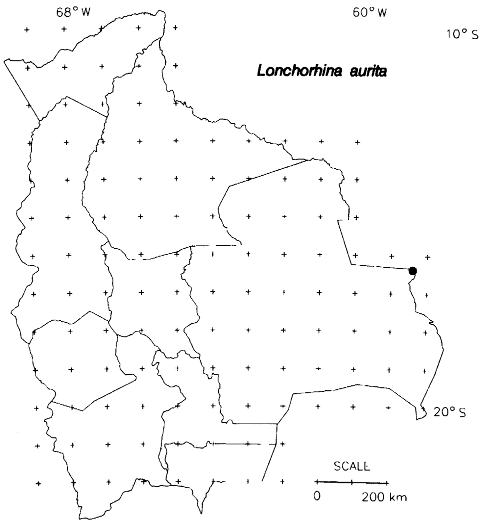


Fig. 529. Localities of known occurrence of *Lonchorhina aurita*.

Dorsal profile of rostrum extremely convex, depression present between the orbits. Tail reaches edge of broad uropatagium. Noseleaf greatly elongated" (Koopman, 1994: 74).

Lonchorhina aurita Tomes, 1863

Sword-nosed Bat or Murcielago de Espada

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Lonchorhina aurita* was described by Tomes (1863: 83); type locality "West Indies," restricted to Trinidad by Hall and Kelson (1959: 104).

Morphological Characters and Comparisons: Measurements in tables 8 and 9 are of the specimen from San Matías (CM 1890). The nose leaf measured 20 mm, the tragus 14, and the greatest length of skull 20.3. Measurements of total length and tail are estimates from specimen in alcohol.

Distributional Notes: Known in Bolivia from only one locality, mapped in figure 529.

Habitat: The only Bolivian specimen "was caught in a cave near San Matais with four *Anoura geoffroyi* and one *Carollia perspicillata*" (Sanborn, 1932: 175).

There are no Bolivian data on habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Lonchorhina aurita: Sanborn, 1932: 174 (specimen from "San Matais"). Handley, 1976: 16. Lassieur and Wilson, 1989: 1 (general information on the species, map, cited Sanborn). Anderson, 1993: 21 (San Matías).

Lonchorhina aurita aurita: Hernandez-Camacho and Cadena, 1978: 229 (cited Sanborn). Anderson et al., 1982: 3. Anderson, 1985b: 6 (name in list). One specimen (CM) is known from San Matías (1622/5824) in eastern Santa Cruz. All above reports for Bolivia are based on this specimen.

Genus *Macrophyllum* Gray, 1838

Dental formula i2/2, c1/1, p2/3, m3/3, total 34, but middle lower premolar greatly reduced and displaced lingually from the tooth row. "Rostrum less than either length or breadth of braincase. Tail reaches edge of broad uropatagium. Tibia and foot unusually elongated" (Koopman, 1994: 74). Distinctive papillae on the interfemoral membrane are noted in the key. The genus includes only one species.

Macrophyllum macrophyllum (Schinz), 1821

Long-legged Bat

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Phyllost*[*oma*]. *macrophyllum* was described by Schinz (1821: 163), type locality Rio Mucuri, Minas Gerais, Brazil. Nelson (1912: 93) used the name *Macrophyllum macrophyllum*.

Morphological Characters and Comparisons: Measurements in tables 8 and 9 are of specimens from the mouth of the río Baures (AM 209320–209321), Independencia (MSB 57010), and Santa Rosa (AM 262424). The thumb is slender and measures 10 if the wrist and metacarpal are included, rather than just 5 as measured from the ball at the base of the proximal phalanx.

Distributional Notes: Known localities are listed below and mapped in figure 530.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

Scientific synonym used for Bolivian specimens is:

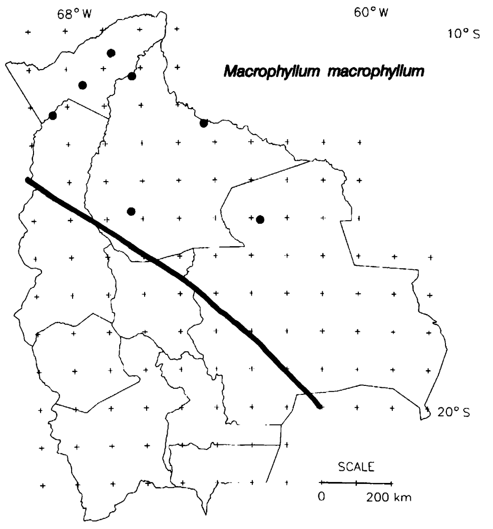


Fig. 530. Localities of known occurrence of *Macrophyllum macrophyllum.*

Macrophyllum macrophyllum: Harrison, 1975: 2 (one specimen from río Baures mouth). Anderson et al., 1982: 3. Anderson and Webster, 1983: 2 (Tumichucua). Webster and Fugler, 1984: 16 (Tumichucua). Anderson, 1985b: 6 (name in list). Emmons and Feer, 1990: 56 (mentioned Bolivia). Emmons and Smith, 1992 (Centro Dieciocho). Anderson, 1993: 21 (general distributional records).

LOCALITIES (7) AND SPECIMENS (9): **Beni:** 1113/6614, Tumichucua, 2 LSU; 1230/6418, mouth of río Baures, 2 AM; 1448/6619, Campamento El Trapiche, 1 MNLP. **Pando:** 1036/6647, Centro Dieciocho, 18 km N of San Juan de Nuevo Mundo, 1 CBF (Emmons and Smith, 1992); 1126/6734, Independencia, 1 MSB; 1213/6824, Santa Rosa, 1 AM. **Santa Cruz:** 1503/6245, río Negrillo, 1 MNK.

Genus *Micronycteris* Gray, 1866

These are "small to medium-sized bats with a well-developed noseleaf and a tail extending only to the middle of the interfemoral membrane. In the subfamily Phyllostominae, the dental formula of i2(1)/2, c1/1, p2/3, m3/3 is shared only with the genera *Macrotus* and *Vampyrum.* The one species with only one pair of upper incisors is *M. daviesi.* Rostrum not as long as braincase; auditory bullae small [the greatest diameter less than the distance between them]; middle lower premolar approximately same size as last lower premolar" (Genoways and Williams, 1986: 308). Bolivian species are placed in three subgenera.

Another species of *Micronycteris* may occur in Bolivia, *M. behni.* It has been recorded on both sides of Bolivia, in Peru, and in Brazil (Sanborn, 1949). However, more specimens from this region are needed for a critical review of the taxonomic status of *M. behni* and *M. sylvestris.*

Subgenus (*Barticonycteris*) Hill, 1964

TAXONOMIC REMARKS: *Barticonycteris* was included in *Glyphonycteris* by Genoways and Williams (1986: 308).

Dental formula i1/2, c1/1, p2/3, m3/3, total 32. "Ears not connected by a band. Skull with a high braincase, but a low coronoid process .... Single upper incisor chisel-shaped. Upper canine unusually short and premolariform. Anterior upper premolar slightly smaller than posterior. Lower incisors scoop-like and lower premolars caniniform" (Koopman, 1994: 74).

Micronycteris daviesi (Hill), 1964

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Barticonycteris daviesi* was described by Hill (1964: 557), type locality "Forest reserve 24 miles from Bartica, along the Potaro road, British Guiana."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Forearm longer than 50 mm; skull longer than 25 mm; dorsal hair brownish; sagittal crest straight (Genoways and Williams, 1986: 307). Forearm length is 53–58 mm; condylobasal length is 22–24 mm (Koopman, 1994: 74). Measurements in tables 8 and 9 are of the specimen from near Ixiamas (CBF 2908).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 531.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

The only scientific name used for the Bolivian specimen is:

Micronycteris daviesi: K. Smith, personal commun. (first report from Bolivia).

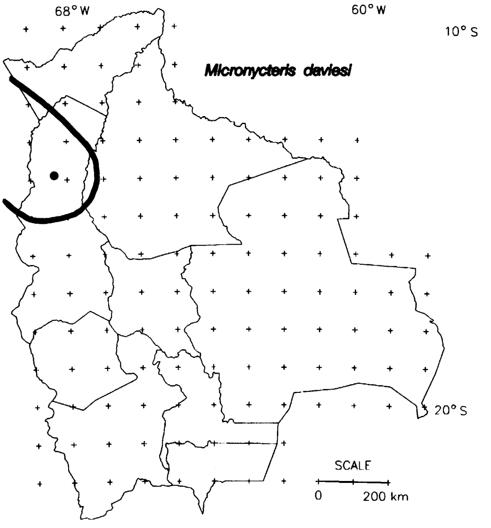


Fig. 531. Localities of known occurrence of *Micronycteris (Barticonycteris) daviesi*.

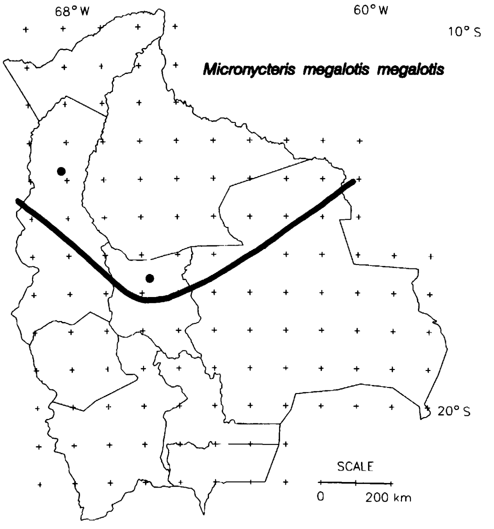


Fig. 532. Localities of known occurrence of *Micronycteris (Micronycteris) megalotis megalotis*.

Specimens, 1: **La Paz:** 1353/6821, 25 km W of Ixiamas, 1 CBF.

Subgenus (*Micronycteris*) Gray, 1866

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Forearm less than 40 mm, length of skull less than 22 (Genoways and Williams, 1986: 307). "Third metacarpal shorter than either fourth or fifth, fifth longest. Ears connected by a high notched band. Skull with a high braincase and a high coronoid process .... Inner upper incisor not chisel-shaped, its front face convex, crown longer than wide. Anterior upper premolar with the main cusp at the middle of the crown, its apex straight. Lower incisor row concave posteriorly, the individual teeth bifid with expanded crowns" (Koopman, 1994: 72).

Micronycteris megalotis
(Gray), 1842

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Phyllophora megalotis* was described by Gray (1842: 257), type locality Brazil; restricted to Pereque, São Paulo, by Cabrera (1958: 60). Sanborn (1932: 173) used the name *Micronycteris megalotis megalotis*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Calcar longer than foot (claws included); length of interfemoral membrane more than twice the length of tail; upper premolars (= P3 and P4) about the same height; $2n = 40$ (in Surinam, Genoways and Williams, 1986: 307). "Interauricular band slightly notched medially. Uropatagium relatively broad. Calcar longer than foot. Middle lower premolar not reduced. Size relatively small (forearm length, 31–38 mm; condylobasal length, 15–18 mm)" (Koopman, 1994: 72). Measurements in tables 8 and 9 are of the specimen from Puerto Patiño (UMMZ 126843).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 532.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

Only one scientific name has been used for Bolivian specimens:

Micronycteris megalotis megalotis
(Gray), 1842

Micronycteris megalotis megalotis: Anderson et al., 1982: 3. Anderson, 1985b: 6 (name in list). Alonso-Mejía and Medellín, 1991: 1 (general information on the species). Anderson, 1993: 21 (general distributional records).

LOCALITIES (2) AND SPECIMENS (3): **Cochabamba:** 1637/6547, Puerto Patiño, 50 km

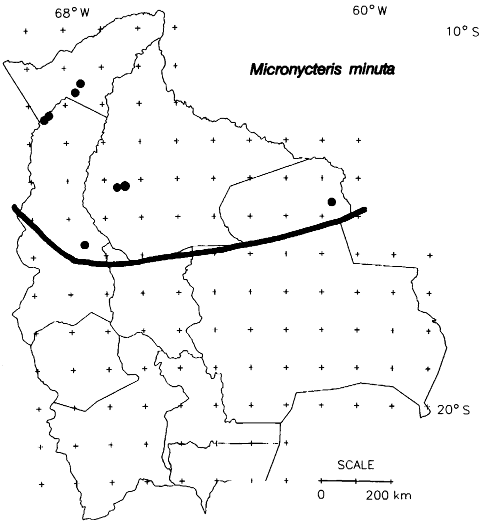


Fig. 533. Localities of known occurrence of *Micronycteris* (*Micronycteris*) *minuta*.

NW of Villa Tunari, 1 UMMZ. **La Paz:** 1345/6809, Ixiamas, 2 MNLP.

Micronycteris minuta (Gervais *in* Castelnau), 1855

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Schizostoma minutum* was described by Gervais (*in* Castelnau, 1855: 50), type locality "Brésil" or Capela Nova, Bahia, Brazil. Thomas (1901e: 191) used the name *Micronycteris minuta*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Calcar shorter than foot (claws included; length of interfemoral membrane less than twice the length of tail; first upper premolar [P3] distinctly shorter than second upper premolar [P4]; $2n = 28$; in Surinam, Genoways and Williams, 1986: 307). "Interauricular band deeply notched medially. Uropatagium relatively narrow . . .. Middle lower premolar reduced" (Koopman, 1994: 73). Measurements in tables 8 and 9 are of specimens (UM 126729, 127173) from 20 km NNE of Caranavi and of two from Espiritú (Aguirre and Urioste, 1994: 72).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 533.

FOOD: Insects found in two stomachs (Aguirre, 1994: 83) included Grillidae, Lepidoptera, and Coleoptera (not identified to family).

HABITS: In a study by Aguirre (1994: 89) at Espíritu and during the first 6 hours of darkness, one individual was netted between 1800 and 2000.

No data for Bolivia are available on habitat, behavior, or reproduction.

Scientific synonym used for Bolivian specimens is:

Micronycteris minuta: Anderson et al., 1982: 3. Sawada and Harada, 1986: 368 (Chivé). Anderson, 1993: 21 (general distributional records). Aguirre, 1994: 50 (isla de bosque Espíritu Viejo). Aguirre and Urioste, 1994: 72 (Espíritu).

LOCALITIES (7) AND SPECIMENS (9): **Beni:** 1411/638, Espíritu, 2 (Aguirre, 1994: 50). **La Paz:** 1542/6735, 20 km NNE of Caranavi, 1 UMMZ. **Santa Cruz:** 1438/6044, 27.5 km S of Campamento Los Fierros, 1 MNK. **Pando:** 1126/6734, Independencia, 1 MSB; 1140/6743, San Miguel, 1 CBF; 1216/6827, 8 km SO de [= SW of] Santa Rosa, 1 CBF; 1223/6835, Chivé, 2 (Sawada and Harada, 1986: 369).

Subgenus (*Trinycteris*) Sanborn, 1949

"Fourth metacarpal shorter than either third or fifth, third longest. Ears not connected by a band. Skull with a relatively low braincase but a high coronoid process . . .. Outer upper incisors reduced. Anterior upper premolar reduced and low with small anterior cusp. Lower incisors small, not crowded, and faintly trifid" (Koopman, 1994: 72). Ears relatively small.

Micronycteris nicefori Sanborn, 1949

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Micronycteris nicefori* was described by Sanborn (1949: 230), type locality Cucuta, Norte de Santander, Colombia.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Length of ear to notch greater than 16 mm; calcar shorter than length of hind foot; "faint gray line often present on lower back; first pair of upper incisors not chisel-shaped . . .; upper incisors projected forward

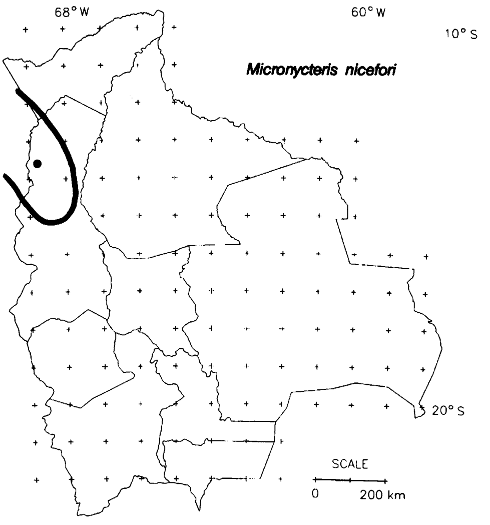


Fig. 534. Localities of known occurrence of *Micronycteris* (*Trinycteris*) *nicefori*.

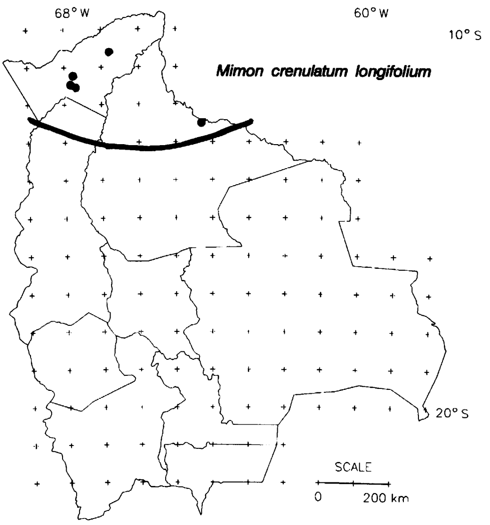


Fig. 535. Localities of known occurrence of *Mimon crenulatum longifolium*.

and out of line with canines; $2n = 28$" (in Surinam, Genoways and Williams, 1986: 308). Measurements in tables 8 and 9 are of a specimen from French Guiana (AM 266019).

DISTRIBUTIONAL NOTES: Known in Bolivia from only one locality, mapped in figure 534.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

Scientific synonym used for Bolivian specimens is:

Micronycteris nicefori: Emmons, 1991: 72 (Alto río Madidi).

LOCALITIES (1) AND SPECIMENS (2): **La Paz:** 1335/6846, Alto río Madidi, campamento Moira, 2 CBF.

Genus *Mimon*, Gray, 1947

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Dental formula i2/1, c1/1, p2/2, m3/3, total 30. "Rostrum shorter than braincase. Tail does not extend to edge of uropatagium" (Koopman, 1994: 76).

Mimon crenulatum (É. Geoffroy Saint-Hilaire), 1810

TAXONOMIC REMARKS: Subgenera of *Mimon* are sometimes recognized, with the subgenus *Anthorhina* Lydekker, *in* Flower and Lydekker, 1891: 674, including this species. Some names used for Bolivian specimens have type localities outside of Bolivia. *Phyllostoma crenulatum* was described by É. Geoffroy Saint-Hilaire (1810: 183), type locality "Amerique," restricted by Cabrera (1958: 66) to "Baia" [= Bahia], Brazil. *Phyllostoma longifolium* was described by Wagner (1843: 365), type locality Villa Maria, Mato Grosso, Brazil. Handley (1960: 460) by implication, first used the name combination, *Mimon crenulatum longifolium*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Forearm length is 45–51 mm; condylobasal length is 18–20 (Koopman, 1994: 76). Measurements in tables 8 and 9 are of specimen (AM 209323) and specimens from Arroyo Hermoso and San Miguel (CBF 1415, 1418).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 535.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Mimon crenulatum longifolium (Wagner), 1843

Mimon crenulatum longifolium: Koopman, 1976: 46 (specimen from mouth of the río Baures). Anderson et al., 1982: 3 (same specimen). Anderson, 1985b: 6 (name in list). Anderson, 1993: 21 (general distributional records).

Mimon crenulatum: Emmons and Smith, 1992 (Centro Dieciocho). Aguirre and Urioste, 1994: 72 (arroyo Hermoso, San Miguel).

LOCALITIES (5) AND SPECIMENS (6): **Beni:** 1230/6418, mouth of the río Baures, 1 AM (209323). **Pando:** 1036/6647, Centro Dieciocho, 1 CBF, 1 US (Emmons and Smith, 1992); 1113/6742, Arroyo Hermoso (Aguirre and Urioste, 1994: 72); 1128/6750, 15 km NO de [= NW of] Puerto Camacho, 1 CBF; 1140/6743, San Miguel, 1 CBF.

Genus *Phyllostomus* Lacépède, 1799

These have been termed the spear-nosed bats but that name is not very distinctive in view of the fact that most of the bats in the family Phyllostomidae have a nose leaf, some appreciably longer than those of *Phyllostomus*.

Dentition, i2/2, c1/1, p2/2 or 3, m3/3, total 32 or 34, the latter in *Phyllostomus stenops*, formerly placed in the genus *Phylloderma* (Peters, 1865b: 513).

Phyllostomus discolor (Wagner), 1843

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Phyllostoma discolor* was described by Wagner (1843: 366), type locality Cuiabá, Mato Grosso, Brazil. The name combination *Phyllostomus discolor discolor* was used by Cabrera (1958: 67).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Forearm length is 56–69 mm; condylobasal length is 25–34 mm. "Calcar shorter than hind foot. Sagittal crest weak or absent" (Koopman, 1994: 76). Measurements in tables 8 and 9 are of specimens from San Joaquín (FM 114863–114870, 114875–114876), Estancia Cachuela Esperanza (AM 260049), La Esperanza (FM 114873–114876).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 536.

FOOD: Insects found in three stomachs studied by Aguirre (1994: 83) included Grillidae, Coleoptera (of at least three families), and Formicidae. The lengths of only two prey items were measureable and these were in the 10–15 and 20–25 mm ranges (Aguirre, 1994: 87).

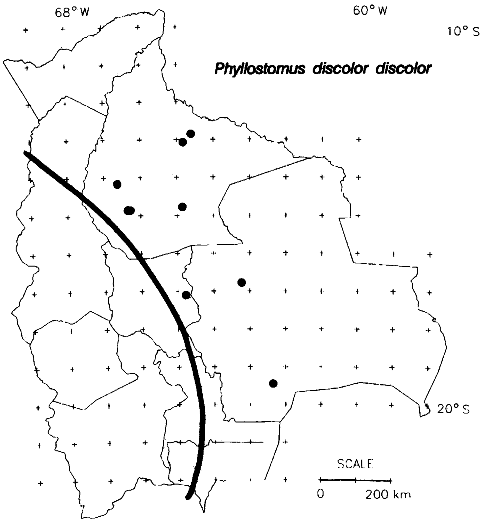


Fig. 536. Localities of known occurrence of *Phyllostomus discolor discolor*.

HABITS: In a study by Aguirre (1994: 89) at Espíritu and during the first 6 hours of darkness, one individual was netted between 1800 and 2000 and two between 2000 and 2200.

No data for Bolivia are available on habitat, behavior, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Phyllostomus discolor discolor (Wagner), 1843

Phyllostomus discolor discolor: Valdez, 1970: 56 (cited four of the following specimens). Ibáñez, 1981: 73 (map). Anderson et al., 1982: 3. Anderson, 1985b: 6 (name in list). Anderson, 1993: 21 (general distributional records).

Phyllostomus discolor: Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Ibáñez and Ochoa, 1989: 217 (Hacienda Cerro Colorado). Eisenberg, 1989: 119 (mentioned northern Bolivia). Wilson and Salazar, 1990: 48 (Estación Biológica del Beni; cited "6" specimens of Anderson-Yates collection from the Estación). Aguirre, 1994: 51 (two localities near Espíritu).

LOCALITIES (10) AND SPECIMENS (31): **Beni:** 1251/6436, La Esperanza, 2 FM; 1304/6449, San Joaquín, 10 FM; 1413/6640, Espíritu, 3 (Aguirre, 1994: 51); 1447/6451, río Ibare, 26 km from mouth, 1 AM; 1451/6617, río Matos, 6 km E of Estación Biológica del Beni, 3 AM, 2 MSB; 1451/6621, 50 km from San Borja on road to San Ignacio, 1 EBD; coordinates unknown, Arruda, 2 FM. **Cochabamba:** 1706/6447, Sajta, 2 AM, 2 CBF, 1 MSB. **Santa Cruz:** 1647/6314, Estancia Cachuela Esperanza, 1 AM; 1927/6221, Hacienda Cerro Colorado, 1 EBD.

Phyllostomus elongatus
(É. Geoffroy Saint-Hilaire), 1810

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Phyllostoma elongatum* was described by É. Geoffroy Saint-Hilaire (1810: 182), type locality "Amerique, selon toute apparence," restricted to "rio Branco, en Mato Grosso," Brazil, by Cabrera (1958: 67), who used the name *Phyllostomus elongatus*. No subspecies have been recognized.

Morphological Characters and Comparisons: Forearm length is 61–71 mm; condylobasal length is 24–28. "Calcar longer than hind foot. Sagittal crest well developed" (Koopman, 1994: 76). Measurements in tables 8 and 9 are of specimens from Puerto Acre (AM 209331), 5 km NW of mouth of río Grande (AM 210671–210674), and 10 km E of San Antonio (AM 210678).

Distributional Notes: Known localities are listed below and mapped in figure 537.

Food: Insects found in three stomachs studied by Aguirre (1994: 83) included Orthoptera (Grillidae), Hemiptera (not identified to family), Coleoptera (of at least four families), and Formicidae. The lengths of only six prey items were measureable and these ranged from 5 to more than 20 mm, with four less than 15 (Aguirre, 1994: 87).

Habits: In a study by Aguirre (1994: 89) at Espíritu and during the first 6 hours of darkness, six individuals were netted between 1800 and 2000.

No data for Bolivia are available on habitat, behavior, or reproduction.

Scientific synonym used for Bolivian specimens is:

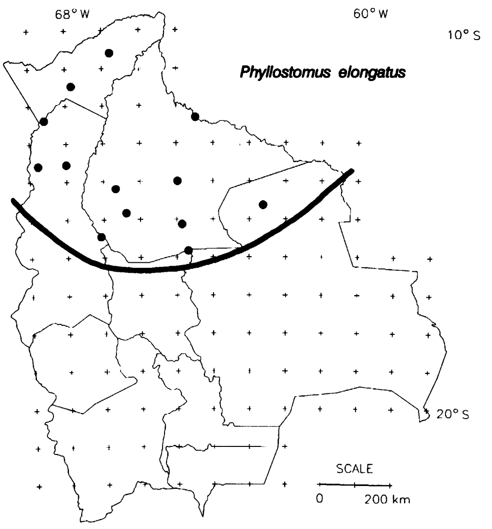


Fig. 537. Localities of known occurrence of *Phyllostomus elongatus*.

Phyllostomus elongatus: Valdez, 1970: 23 (seven of the specimens listed below). Ibáñez, 1981: 78 (map). Anderson et al., 1982: 3. Anderson, 1985b: 6 (name in list). Sawada and Harada, 1986: 368 (Chivé). Wilson and Salazar, 1990: 49 (Estación Biológica del Beni). Emmons, 1991: 72 (Alto río Madidi in La Paz department). Emmons and Smith, 1992 (Centro Dieciocho). Anderson, 1993: 21 (general distributional records). Aguirre, 1994: 51 (two localities, 1406/6622 and 1405/6624, near Espiritu).

Localities (15) and Specimens (24), all from low elevations: **Beni:** 1219/6428, Puerto Acre, 15 km NW Principe da Beira [Brazil], 1 AM; 1400/6458, west side of río Mamoré, 1 AM; 1411/6638 and 1410/6640, near Espíritu, 5 and 1 respectively (Aguirre, 1994: 51); 1450/6623, río Curiraba, Estación Biológica del Beni, 1 US; 1508/6451, 10 km E of San Antonio, 1 AM; 1527/6705, río Quiquibey, 1 IE; 1550/6441, 5 km NW of mouth of río Grande, 6 AM. **La Paz:** 1333/6800, Ixiamas, 2 CBF; 1335/6846, Alto río Madidi (Emmons, 1991: 72). **Pando:** 1036/6647, Centro Dieciocho, 1 CBF, 1 US (Emmons and Smith, 1992); 1128/6750, 15 km NO de [= NW of] Puerto Camacho, 1 CBF; 1223/6835, Chivé, 1 (Sawada and Harada, 1986: 369). **Santa Cruz:** 1438/6237, Perseverencia, 1 MNK.

Phyllostomus hastatus (Pallas), 1767

Taxonomic Remarks: The name used for Bolivian specimens has its type locality out-

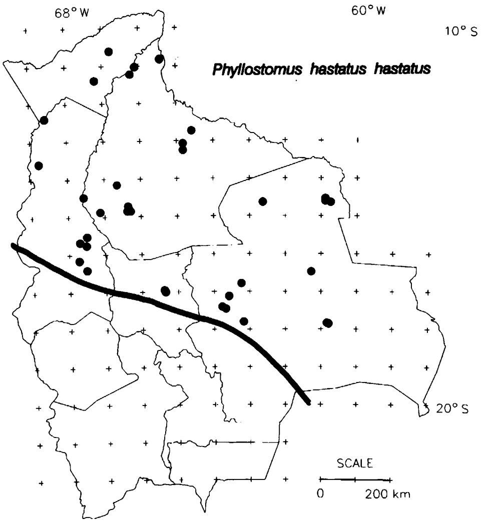


Fig. 538. Localities of known occurrence of *Phyllostomus hastatus hastatus.*

side of Bolivia. *V*[*espertilio*]. *hastatus* was described by Pallas (1767: 7); its type locality was restricted by Allen (1904b: 233) to Surinam. Allen (1904b: 233) first used the name combination *Phyllostomus hastatus hastatus.*

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Size large (forearm length, 80–97 mm; condylobasal length, 31–38 mm). "Calcar longer than hind foot. Sagittal crest well developed" (Koopman, 1994: 76). Measurements in tables 8 and 9 are of specimens from San Joaquín (FM 96060, 96062–96064, 96066, 96068–96070, 114853–114855, 114858–114860, 115066), province of Sara (CM 2755), Buenavista (FM 50988, 50989), the río Yapacaní (FM 21484), and the río Matos (AM 261377).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 538.

FOOD: Insects found in four stomachs studied by Aguirre (1994: 83) included Orthoptera (Grillidae) and Coleoptera (of at least two families). The lengths of only five prey items were measureable, all greater than 15 mm (Aguirre, 1994: 87).

HABITAT: At least eight individuals were observed near Espíritu inside an abandoned termite nest some 3 m from the ground in a palm tree, *Scheelea princeps* (Aguirre, 1994: 100).

HABITS: In a study by Aguirre (1994: 89) at Espíritu and during the first 6 hours of darkness, six individuals were netted between 1800 and 2000 and two between 2000 and 2200.

No data for Bolivia are available on behavior or reproduction.

Scientific synonyms used for Bolivian specimens are:

Phyllostomus hastatus hastatus
(Pallas), 1767

Phyllostomus hastatus curaca Cabrera, 1917: 12, 1958: 68 (type locality Archidona, on the río Napo, eastern Ecuador; "hasta Bolivia").

Phyllostomus hastatus hastatus: Valdez, 1970: 94. Anderson et al., 1982: 3. Anderson and Webster, 1983: 2 (Guayaramerin, Tumichucua). Webster and Fugler, 1984: 16 (Tomonoco, Tumichucua, Guayaramerin). Anderson, 1985b: 6 (name in list). Emmons and Smith, 1992 (Centro Dieciocho). Anderson, 1993: 21 (general distributional records). Anderson et al., 1993: 21 (vicinity of Santa Cruz de la Sierra).

Phyllostomus hastatus: Sanborn, 1932: 175 (Buenavista and Province of Sara). Arce Pereira et al., 1963: 152 (name in list; Todos Santos). Ibáñez, 1981: 83 (map). Myers and Wetzel, 1983: 11 (río Yapacaní and Buenavista). Barquez, 1984a: 218 (San José de Chiquitos). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Ibáñez and Ochoa, 1989: 216 (38 km E of La Florida). Wilson and Salazar, 1990: 49 (in list for Estación Biológica del Beni). Emmons, 1991: 72 (Alto río Madidi in La Paz department). Aguirre, 1994: 52 (two localities near Espíritu). Aguirre and Urioste, 1994: 72 (Espíritu, 1413/6640).

LOCALITIES (46) AND SPECIMENS (132): **Beni:** 1049/6525, Guayaramerin, 1 LSU; 1113/6614, Tumichucua, 2 LSU; 1244/6435, 15 km above Horquilla, on río Machupa, 2 AM; 1304/6449, San Joaquín, 26 FM, 1 AM; 1315/6449, Yutiole, 5 AM; 1411/6638, isla de bosque Espíritu Viejo, 5 (Aguirre, 1994: 66); 1413/6640, Espíritu, 1 (Aguirre, 1994: 66); 1428/6734, 1 km N Rurrenabaque, 3 UMMZ; 1443/6621, 15 km N of Porvenir, 1 IE; 1448/6619, Campamento El Trapiche, 2 MNLP, 2 IE; 1451/6617, río Matos, 6 km E of Estación Biológica del Beni, 1 AM, 1 MSB; 1451/6621, Estación Biológica del Beni, 4 IE; 1451/6621, La Cabaña, 6 EBD; 1451/6621, Florida, 45 km E of San Borja, 1 EBD; 1451/6621, 50 km from San Borja on road to San Ignacio, 1 EBD; 1451/6621, Totaisal, 55 km from San Borja, 1 EBD; 1451/6622, río Matos, 1 IE; 1452/6707, Km 35, NW of Yucumo, 1 MSB. **Cochabamba:** 1657/6523, 2 km E of Villa Tunari, 1 AM; 1660/6521, 4 km SE of Villa Tunari, 2 UMMZ; coordinates unknown, Campamento II (Univ. Cochabamba), 1 MNK. **La Paz:** 1335/6846, Campamento Moira, Alto río Madidi (Emmons, 1991: 72), 2 IE; 1531/6730, Tomonoco, 1 mi [= 1.6 km] W of Puerto Linares, 1 TTU (Webster and Fugler, 1984); 1545/6731, 1 km S of La Reserva, 1 CBF; 1540/6742, 4 km NW of Alcoche, 1 UMMZ; 1609/6744, Chijchijpa, 1224 m, 1 AMNH, 1 CBF; 1624/6731, Chulumani, 1 BM. **Pando:** 1036/6647, Centro Dieciocho (Emmons and Smith, 1992); 1101/6606, W bank río Beni, opposite Hamburgo, 1 AM; 1123/6712, Bella Vista, 1 AM, 1 MSB; 1223/6835, Chivé, 1 MNLP. **Santa Cruz:** 1432/6053, Los Fierros, EBD 14343; 1436/6053, 38 km E of La Florida (Ibáñez and Ochoa, 1989); 1438/6044, 55 km E of Aserradero Moira, 3 EBD; 1438/6237, Perseverencia, 3 MNK; 1628/6116, Esperanza, near Concepción, 2 BM; 1647/6314, Estancia Cachuela Esperanza, 1 AM; 1707/6335, province of Sara, 5 CM; 1724/6346, río Yapacaní, 1 FM; 1724/6346, 25 km W of Buenavista, on west bank of río Yapacaní, 1 UMMZ; 1727/6340, Buenavista, 16 BM, 1 AM, 1 CM, 2 FM, 2 MACN; 1748/6310, Santa Cruz de la Sierra, 1 CM; 1750/6050, San José de Chiquitos, 5 IML (Barquez, 1984a); 1751/6047, Chiquitos, in province of Santiago, 1 FM; coordinates unknown, N. Moka, 1 MACN.

Phyllostomus stenops (Peters), 1865

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia; *Ph[ylloderma]. stenops* was described by Peters (1865b: 513), type locality Cayenne, French Guiana. *Phylloderma* was combined with *Phyllostomus* by Van Den Bussche and Baker (1993: 793).

Morphological Characters and Comparisons: "Middle lower premolar greatly reduced but not displaced lingually from the toothrow. Rostrum shorter than braincase. Dorsal profile of rostrum not convex, no depression between orbits" (Koopman, 1994: 76). Measurements in tables 8 and 9 are of specimens from 7 km N of Santa Rosa (413, the holotype of *P. s. boliviensis*, Ojeda and Barquez, 1978) and from Arima on the island of Trinidad (AM 205371, of the subspecies *P. s. stenops*).

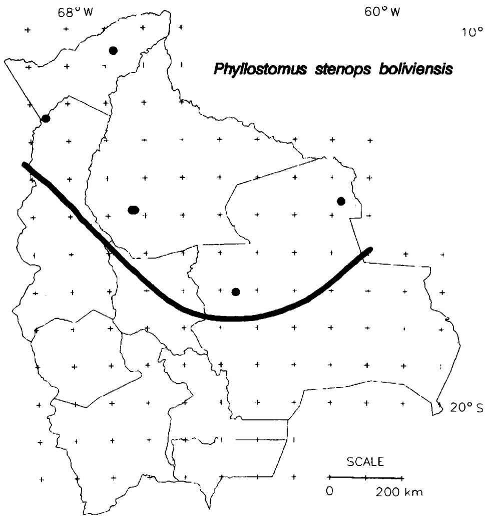


Fig. 539. Localities of known occurrence of *Phyllostomus stenops boliviensis.*

Distributional Notes: Known localities are listed below and mapped in figure 539.

No Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: Record of one female with one embryo in September.

Scientific synonyms used for Bolivian specimens are:

Phyllostomus stenops boliviensis (Barquez and Ojeda), 1979

Phylloderma sp.: Barquez, 1977: 266 (from 7 km N of Santa Rosa).

Phylloderma stenops: Ojeda and Barquez, 1978: 35. Wilson and Salazar, 1990: 49 (río Matos). Emmons and Feer, 1990: 59 (mentioned Bolivia). Emmons and Smith, 1992 (Centro Dieciocho).

Phylloderma stenops boliviensis Barquez and Ojeda, 1979: 84 (type locality 7 km N of Santa Rosa in the province of Sara, Santa Cruz, 1703/6335). Anderson et al., 1982: 3. Barquez, 1984a: 218 (same locality). Anderson, 1985b: 7

(name in list). Anderson, 1993: 22 (general distributional records).

Phyllostomus stenops: Van Den Bussche and Baker, 1993: 793 (combined *Phylloderma* with *Phyllostomus*).

LOCALITIES (6) AND SPECIMENS (8): **Beni:** 1451/6621, 1 km SW Porvenir, Totaisal, 1 MNLP; 1451/6617, río Matos, 1 MNLP, 1 US (Wilson and Salazar, 1990: 49). **Pando:** 1036/6647, Centro Dieciocho (Emmons and Smith, 1992); 1223/6835, Chivé, 1 MNLP. **Santa Cruz:** 1438/6045, 23 km S of Campamento Los Fierros, 1 MNK; 1703/6335, 7 km N of Santa Rosa, 2 IML.

Phyllostomus, species not determined

LOCALITIES (5) AND SPECIMENS (20): **Cochabamba:** 1706/6529, Palmar, 2 MACN (not seen); 1724/6609, cerca Cochabamba, 1 MACN (not seen). **Santa Cruz:** 1727/6340, Buena Vista, 14 MACN (phyllostomids); 1748/6310, Santa Cruz (assumed to be the city), 2 MACN (1 not seen); 1927/6221, Cerro Colorado, 1 EBD (not seen).

Genus *Tonatia* Gray *in* Griffith, 1827

TAXONOMIC REMARKS: Bolivian specimens previously referred to *T. bidens* are now referred to *T. saurophila*. *Vampyrus bidens* was described by Spix (1823: 64), type locality rio So Francisco, Bahia, Brazil.

Dental formula i2/1, c1/1, p2/3, m3/3, total 32. "Middle lower premolar reduced but not displaced lingually from the toothrow. Rostrum shorter than braincase. Tail does not extend to edge of uropatagium" (Koopman, 1994: 75).

Tonatia brasiliense (Peters), 1866

TAXONOMIC REMARKS: The type locality for the name used for Bolivian specimens is not in Bolivia. *Lophostoma brasiliense* was described by Peters (1866: 674), type locality Bahia, Brazil. *Tonatia brasiliense* was first used by Trouessart (1904: 111).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Forearm length is 33–40 mm; condylobasal length is 15–18. "Ear pinna relatively long. Postorbital constriction and sagittal crest well developed" (Koopman, 1994: 75). Measurements in tables 8 and 9 are of the specimens from 1450/6623 (MNLP 685, = CBF 0179) and 1448/6619 (CBF 0178).

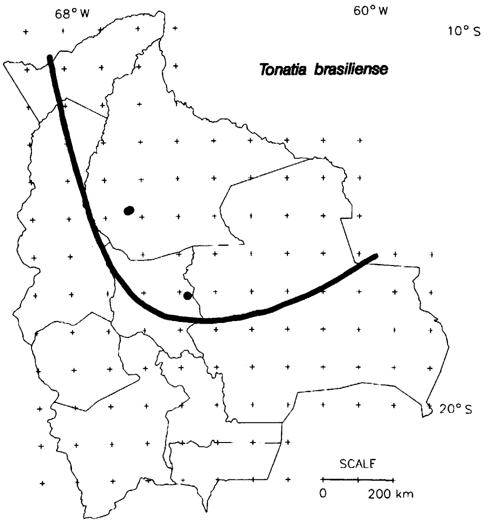


Fig. 540. Localities of known occurrence of *Tonatia brasiliense*.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 540.

No Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: A female taken in September had one embryo (25 mm).

Scientific name used for Bolivian specimens is:

Tonatia brasiliense: Wilson and Salazar, 1990: 48 (first Bolivian record; Estación Biológica del Beni). Anderson, 1993: 21 (cited Wilson and Salazar).

LOCALITIES (3) AND SPECIMENS (3): **Beni:** 1448/6619, Trapiche, 1 IE; 1450/6623, 5 km N El Porvenir, 1 MNLP. **Cochabamba:** 1706/6447, Sajta, 1 AM.

Tonatia carrikeri (Allen), 1910

TAXONOMIC REMARKS: The type locality for the name used for Bolivian specimens is not in Bolivia. *Chrotopterus carrikeri* was described by Allen (1910: 147), type locality río Mocho, Venezuela. Goodwin (1942: 207) first used the name combination *Tonatia carrikeri*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Forearm length is 43–80 mm; condylobasal length is 18–22. "Ear pinna rela-

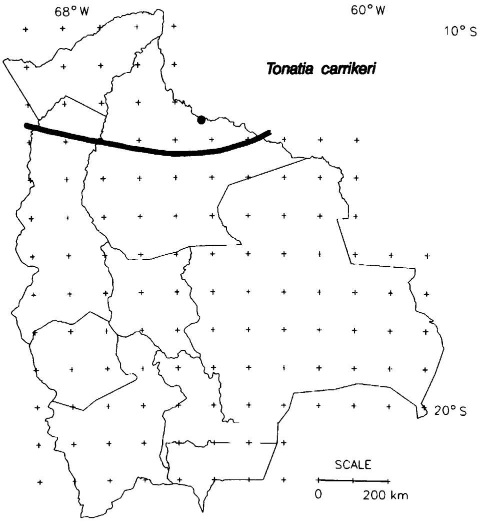


Fig. 541. Localities of known occurrence of *Tonatia carrikeri.*

tively long. Postorbital constriction and sagittal crest well developed . . ., underparts white" (Koopman, 1994: 75). Measurements in tables 8 and 9 are of this specimen (AM 209322).

DISTRIBUTIONAL NOTES: Known in Bolivia from only one locality, mapped in figure 541.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

The scientific synonym used for Bolivian specimens is:

Tonatia carrikeri: Koopman, 1976: 45 (one specimen). Anderson et al., 1982: 3 (same specimen). Genoways and Williams, 1984: 329 (key to species). Anderson, 1985b: 6 (name in list). McCarthy et al., 1992 (summary of species). Anderson, 1993: 21 (same specimen).

One Bolivian specimen (AM) is known, from the río Iténez, opposite Costa Marques [Brazil] in Beni (1229/6417).

Tonatia saurophila
Koopman and Williams, 1951

TAXONOMIC REMARKS: In a recent review of the "*Tonatia bidens* complex," Williams et al. (1995) recognized two species, *T. bidens* and *T. saurophila*, both of which were recorded as occurring near Bolivia, although no Bolivian specimens were examined. *Tonatia bidens* was recorded from four localities within 200 km of Bolivia in Argentina, Brazil, and Paraguay. The type locality of *T. saurophila* (Koopman and Williams, 1951: 11) is "Wallingford Roadside Cave, Bulaclava, St. Elizabeth Parish, Jamaica, British West Indies." Bolivian material previously referred to *T. bidens* probably is *T. saurophila*, based on geographic proximity to Peruvian localities from which this species was reported by Williams et al. (1995: 619). The specimen from Sajta was restudied by Jorge Salazar and identified as *T. saurophila* on the basis of characters given by Williams et al. (1995: 619). The type locality of *T. s. maresi* is "Blanchisseuse, Trinidad and Tobago." Its range was mapped south into Peru near the Bolivian border on the río Madre de Dios.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Forearm length is 52–57 mm; condylobasal length is 23–25. Ear pinna relatively short, 32 or less, without a connecting band; tragus relatively short. Postorbital constriction (5.0–5.6 rather than 5.6–6.1 as in *T. bidens*) and sagittal crest poorly developed (Williams et al., 1995: 621). Also differs from *Tonatia bidens* in having "a short, pale stripe on top of head between ears," the lower canines separated by a relatively wide gap, and the second lower premolar larger, with crown less than one-half occluded by cingula of adjacent premolars (Williams et al., 1995: 621). Measurements in tables 8 and 9 are of specimens from Alto Ucayali in Peru (AM 76559) and Siparia on the island of Trinidad (AM 180261).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 542.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

Scientific synonym used for Bolivian specimens is:

Tonatia saurophila maresi
Williams et al., 1995

Tonatia bidens: Sawada and Harada, 1986: 368 (Chivé). Anderson, 1991: 142 (Chivé). Emmons and Smith, 1992 (0952/6542). Anderson, 1993: 21 (general distributional records).

LOCALITIES (5) AND SPECIMENS (5): **Beni:** 1413/6640, Espíritu, 1 IE. **Cochabamba:** 1706/6447, Sajta, 1 MSB; **Pando:** 0952/6542, río Negro, 1 CBF; 1036/6647, Centro

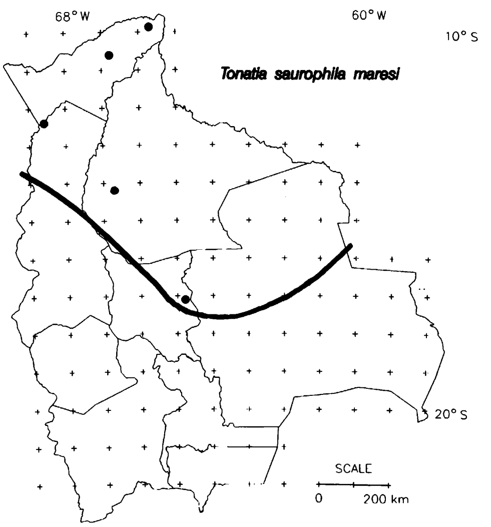


Fig. 542. Localities of known occurrence of *Tonatia saurophila maresi.*

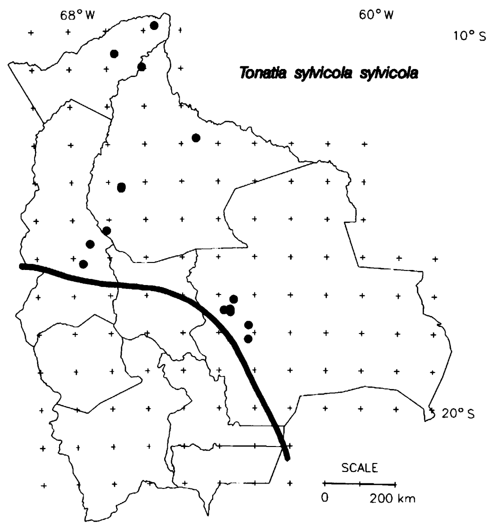


Fig. 543. Localities of known occurrence of *Tonatia silvicola silvicola.*

Dieciocho (Emmons and Smith, 1992); 1223/6835, Chivé, 1 (Sawada and Harada, 1986: 369).

Tonatia sylvicola sylvicola (d'Orbigny), 1836

TAXONOMIC REMARKS: Patterson (1992: 12) has argued convincingly that the spelling *silvicola* on plate 6 (d'Orbigny, 1836) was a printer's error subsequently corrected to *sylvicola* by d'Orbigny himself. Original misspellings are to be corrected (Art. 32(d), International Commission on Zoological Nomenclature, 1985).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Forearm length is 49–60 mm; condylobasal length is 22–25. "Ear pinna relatively long, with a low connecting band. Postorbital constriction and sagittal crest well developed" (Koopman, 1994: 75). Measurements in tables 8 and 9 are of specimens from the left bank of the río Beni (AM 262425), Serranía Bellavista (LSU 22713), Buenavista (BM 23.12.12.2 and 27), province of Sara (CM 2170), the río Dolores (CM 2761), and La Esperanza (FM 114851).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 543.

FOOD: Insects found in five stomachs studied by Aguirre (1994: 83) included Orthoptera (Grillidae) and Coleoptera (of at least two families). The lengths of only two prey items were measurable, both were in the 10–15 mm range (Aguirre, 1994: 87).

HABITS: In a study by Aguirre (1994: 89) at Espíritu and during the first 6 hours of darkness, one individual was netted between 2000 and 2200 and four between 2200 and 2400.

No data for Bolivia are available on habitat, behavior, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Lophostoma sylvicolum d'Orbigny, 1836 [year given by Sherborn and Griffin, 1934, for this plate], plate 6. D'Orbigny and Gervais, 1847: 11 (description, type locality "des grandes forets qui bordent le pied oriental de la Cordillère bolivienne, au pays des sauvages Yuracarès," between the rivers Sécure and Isibara, thus in Beni or Cochabamba, the boundary and exact source both being uncertain); Gervais, 1855: 48.

Chrotopterus auritus: Sanborn, 1932a: 175 (three misidentified specimens from the province of Sara and from río Dolores in same province).

Tonatia amblyotis: Goodwin, 1942: 209 (specimens from Buena Vista, Surutú, and río Dolores).

Tonatia brasiliensis: Vieira, 1955: 360 ("Bolivia," included *Lophostoma sylviculum* in the synonymy of *T. brasiliensis*; however I have not seen any specimen that Vieira may have been referring to).

Tonatia silvicola silvicola: Cabrera, 1958: 64. Davis and Carter, 1978: 7 (history of names and spelling, specimens from Buenavista and río Dolores). Anderson et al., 1982: 3. Anderson, 1985b: 6 (name in list). Medellín and Arita, 1989: 2 (general information on species). Anderson, 1993: 21 (general distributional records). Anderson et al., 1993: 20 (vicinity of Santa Cruz de la Sierra).

Tonatia silvicola: Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Wilson and Salazar, 1990: 48 (in list for Estación Biológica del Beni; mention a specimen collected by Anderson-Yates [1985], but I am unaware of any such specimen). Emmons and Smith, 1992 (0952/6542, 1036/6647). Aguirre, 1994: 66 (two localities near Espíritu).

Tonatia sylvicola sylvicola: Patterson, 1992: 12 (on spelling of the name).

LOCALITIES (16) AND SPECIMENS (30): **Beni:** 1251/6436, La Esperanza, 1 FM; 1410/6640, isla de bosque El Chaco near Espíritu, 1 (Aguirre, 1994: 66); 1413/6640, isla de bosque El Encanto near Espíritu, 4 (Aguirre, 1994: 66); 1517/6704, Serranía de Pilón, 1 CBF; coordinates unknown, Laguna Bolivia, N side, 1 CBF. **La Paz:** 1538/6732, Serranía Bellavista, 47 km by road N Caranavi, 1 LSU; 1609/6744, Chijchijpa, 1 MSB. **Pando:** 0952/6542, Main camp on río Negro, 1 CBF (Emmons and Smith, 1992); 1036/6647, Centro Dieciocho, 2 CBF, 1 US (Emmons and Smith, 1992); 1057/6603, left bank of río Beni, 1 AM. **Santa Cruz:** 1707/6335, province of Sara, 1 CM; 1722/6341, río Dolores, province of Sara, 1 CM, 1 FM; 1724/6351, Surutú, or río Surutú, 1 CM; 1727/6340, Buenavista, 1 CM, 2 BM, 4 MACN; 1748/6310, Santa Cruz de la Sierra, 3 IML; 1810/6311, 10 km E of Ingeniero Mora, 1 MSU (not examined).

Genus *Trachops* Gray, 1847

Dental formula i1/2, c1/1, p2/3, m3/3, total 34, "but middle lower premolar greatly reduced and displaced lingually from the toothrow. Rostrum shorter than braincase. Tail shortened, not reaching edge of uropatagium. Lips and chin with numerous small excrescences" (Koopman, 1994: 77). The genus has only one species.

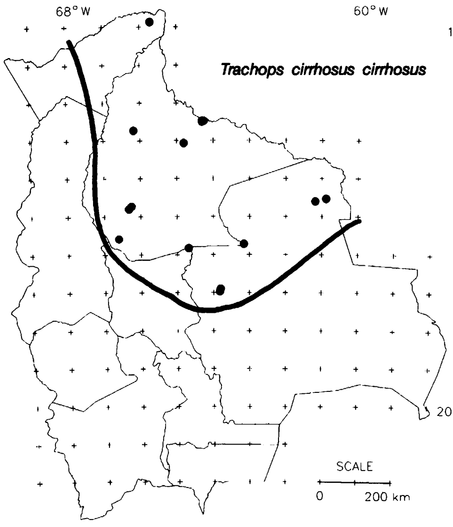


Fig. 544. Localities of known occurrence of *Trachops cirrhosus cirrhosus*.

Trachops cirrhosus (Spix), 1823

Fringe-lipped Bat

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Vampyrus cirrhosus* was described by Spix (1823: 64), type locality "Brazil," given as Pernambuco by Cabrera (1958: 67), restricted to Para by Husson (1962: 115). Koopman (1994: 77) noted that the subspecies *T. c. ehrhardti* Felten, 1956, "perhaps" occurs in Bolivia.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 8 and 9 are of specimens from 4 km above Costa Marques (AM 209351), 1.5 km below Costa Marques (AM 209349), and 6 km W of Ascención (AM 261378).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 544.

No Bolivian data are available on habitat, habits, behavior, or food.

PARASITOLOGY: Brennan (1970: 811) reported two species of chiggers, *Beamerella acutascuta* and *Hooperella vesperuginis*, both from Versalles.

REPRODUCTION: One female in October had one embryo.

Scientific synonyms used for Bolivian specimens are:

Trachops cirrhosus cirrhosus (Spix), 1823

Trachops cirrhosus cirrhosus: Koopman, 1976: 46 (five localities in Bolivia). Ibáñez, 1981: 89 (map). Anderson et al., 1982: 4 (same records). Anderson, 1985b: 7 (name in list). Anderson, 1993: 22 (general distributional records).

Trachops cirrhosus: Brennan, 1970: 811 (chiggers, Versalles). Ibáñez, 1985: 329 (1658/6349). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Ibáñez and Ochoa, 1989: 219 ("near" La Florida). Wilson and Salazar, 1990: 49 (in list for Estación Biológica del Beni). Emmons and Feer, 1990: 60 (mentioned Bolivia). Hinojosa *in* Estenssoro, 1990 (collected in Chimane region). Emmons and Smith, 1992 (0952/6542). Hinojosa, 1992 (Serranía Eva Eva).

Localities (15) and Specimens (21): **Beni:** 1229/6415, 4 km above Costa Marques [Brazil], 1 AM; 1229/6418, 1.5 km below Costa Marques, on río Iténez, 2 AM; 1230/6418, mouth of río Baures, 1 AM; 1244/6610, Versalles, 1 AM; 1304/6448, Camino Vilches, 1 FM; 1444/6615, Campamento 08, 1 MNLP, 1 IE; 1448/6619, Campamento El Trapiche, 1 AM, 1 MNLP; 1536/6638, Sierra Eva Eva, 1 IE. **Pando:** 0952/6542, Main camp on río Negro, 1 CBF (Emmons and Smith, 1992). **Santa Cruz:** 1432/6053, Los Fierros, EBD 14252; 1436/6111, "near" La Florida (Ibáñez and Ochoa, 1989); 1543/6309, 6 km by road W of Ascencion, 1 AM; 1550/6441, río Mamoré, 5 km NW of mouth of río Grande, 6 AM; 1654/6348, La Ponderosa, 1 EBD; 1658/6349, 25 km NW of Santa Rosa de Sara, 1 (Ibáñez, 1985).

Genus *Vampyrum* Rafinesque, 1815

Dental formula i2/2, c1/1, p2/3, m3/3, total 34. "Molars narrowed with considerable distortion of cusp pattern. Rostrum as long as braincase. Uropatagium broad but tail absent" (Koopman, 1994: 77). The genus contains only one species.

Vampyrum spectrum (Linnaeus), 1758

False Vampire Bat or Vampiro Falso

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Vespertilio Spectrum* was described by Linnaeus (1758: 31), type locality "America australi," restricted to Surinam by Thomas, 1911: 130.

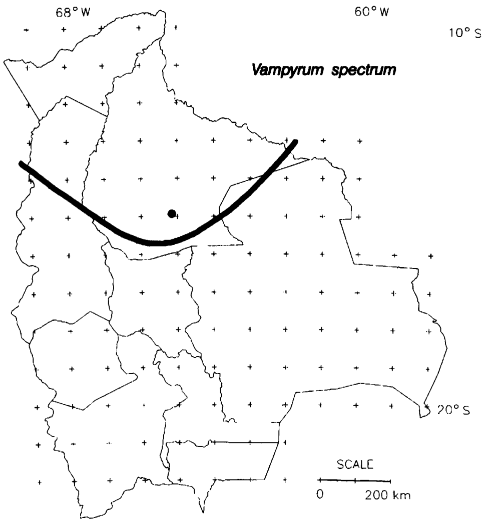


Fig. 545. Localities of known occurrence of *Vampyrum spectrum*.

Morphological Characters and Comparisons: This is the largest of the New World bats. Measurements in tables 8 and 9 are of the only Bolivian specimen (AM 261379).

Distributional Notes: Known in Bolivia from only one locality, mapped in figure 545.

No Bolivian data are available on habitat, habits, behavior, or reproduction.

Food: When captured, the bat was carrying a partly eaten specimen of *Oecomys mamorae* (AM 262012).

Scientific synonym used for Bolivian specimens is:

Vampyrum spectrum: Eisenberg, 1989: 123 (undocumented mention of Bolivia). Emmons and Feer, 1990: 61 (undocumented mention of Bolivia). Anderson, 1991: 142 (first Bolivian specimen). Simmons, 1994: 25 (drawings of skeletal elements used in comparative study, AM 261379 from 1456/6309). Specimen, 1. **Beni:** 1456/6509, río Tijamuchi, 1 AM.

SUBFAMILY LONCHOPHYLLINAE GRIFFITHS, 1982

Griffiths (1982) included three genera in the Lonchophyllinae, namely *Lonchophylla*, *Lionycteris*, and *Platalina*. He did not give a concise diagnosis for the subfamily but did emphasize the following characters of the tongue: "The tongues of these three genera have lost most of the papilla types found on the tongues of other phyllostomids, most notably the horny and circumvallate types. Although there are hairlike papillae present, they are very differently arranged than in the *Glossophaga*-like glossophagines. Rather than being concentrated on the anterodorsal surface to form a brush tip, the hairlike papillae are arranged in two lines, one line just dorsal and one line just ventral to a deep longitudinal groove ... that runs the length of the tongue in all three genera" (Griffiths, 1982: 33). The genus *Lionycteris* was said (Emmons and Feer, 1990: 63) to occur in Bolivia, but no details were given and I know of no specimen from Bolivia. *Lionycteris spurrelli*, the only species in the genus, is known from Peru to the west of Bolivia (Tuttle, 1970: 68).

Genus *Lonchophylla* Thomas, 1903

Dental formula i2/2, c1/1, p2/3, m3/3, total 34. "Rostrum roughly equal to braincase in length. Postcanine maxillary teeth not reduced in size and with last premolar in contact with molars .... Anterior upper premolar reduced and laterally conpressed. First two upper molars with W-shaped ectolophs. Lower premolars with middle cusps reduced" (Koopman, 1994: 77). Seven species are known, but only one in Bolivia.

Lonchophylla thomasi Allen, 1904

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Lonchophylla thomasi* was described by Allen (1904: 230b), type locality Ciudad Bolívar, Venezuela.

Morphological Characters and Comparisons: "Size relatively small (forearm length, 31–34 mm; condylobasal length, 18–21 mm; maxillary toothrow length, 6.2–7.0 mm). Lingual cusp of last upper premolar well-developed, the tooth thus T-shaped. Posterior cusp of anterior lower premolar well developed and hooklike. Posterior palatal emargination V-shaped" (Koopman, 1994: 78). Measurements in tables 8 and 9 are of specimens from 1.5 km below Costa Marques (AM 209358), 7 km N of Lagoina (AM 210688), 1 mi [= 1.6 km] W of Puerto Linares (MSU 32858), San Joaquín (FM 96072), and Agua Dulce (AM 262434, 262429).

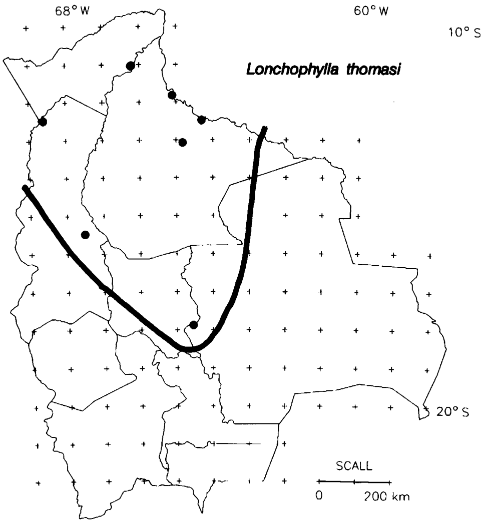


Fig. 546. Localities of known occurrence of *Lonchophylla thomasi*.

Distributional Notes: Known localities are listed below and mapped in figure 546.

No Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: A female with one embryo was recorded in October.

Scientific synonyms used for Bolivian specimens are:

Lonchophylla thomasi: Koopman, 1976: 46 (two specimens from Beni). Anderson et al., 1982: 4. Webster and Fugler, 1984: 16 (Tomonoco). Sawada and Harada, 1986: 368 (Nueva España). Anderson, 1993: 22 (general distributional records).

Lonchophylla tomasi: Anderson, 1985b: 7 (misspelled name in list).

Localities (9) and Specimens (12): **Beni:** 1149/6506, 7 km N of Lagoinha, on río Mamoré, 1 AM; 1229/6418, 1.5 km below Costa Marques [Brazil], on río Iténez, 1 AM; 1304/6449, San Joaquín, 1 FM (probably of this species). **La Paz:** 1529/6731, 1 mi W [= 1.6 km] of Puerto Linares, 1 MSU, 1 TTU (Webster and Fugler, 1984, Tomonoco); 1618/6732, río Solocama, 14 km from Chulumani, 1 CBF. **Pando:** 1101/6612, Agua Dulce, 2

AM; 1102/6613, Puerto Candelaria, río Madre de Dios, 2 CBF; 1228/6836, Nueva España, Chivé, 1 (Sawada and Harada, 1986: 368). **Santa Cruz:** 1753/6433, El Tunal, cantón Comarapa, 1 MNLP.

SUBFAMILY GLOSSOPHAGINAE
BONAPARTE, 1845

The long-tongued bats, or murcielagos nectarios, are also long-nosed. "Upper incisors and canine not bladelike [as in vampires]. Noseleaf small but well developed with prominent upright portion. Tongue elongate, without lateral grooves; but with a brush tip of bristlelike papillae. The tongue musculature exhibits a transverse pattern in section (encircling lingual veins) and is supplied by a single longitudinal artery. Anterior upper premolar separated from canine, posterior premolar, or both. Zygomatic arch may or may not be complete" (Koopman, 1994: 80). Four genera are known from Bolivia: *Anoura*, *Choeroniscus*, *Glossophaga*, and *Lichonycteris*.

Genus *Anoura* Gray, 1838

These are sometimes termed the tailless bats, although *A. caudifer* and *A. cultrata* have rudimentary tails that may be easily overlooked.

TAXONOMIC NOTES: One Bolivian skull was referred to *Anoura minor* by Gerrard (1862: 39), but I did not see the skull in the British Museum and have no idea what it may be.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Dental formula i2/0, c1/1, p3/3, m3/3, total 32. "Zygomatic arch complete or incomplete. Upper premolars separated from one another and from canines. Tail greatly reduced or absent. Stylohyoideus muscle absent. Median circumvallate papillae absent" (Koopman, 1994: 82).

Anoura caudifer (É. Geoffroy Saint-Hilaire), 1818

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Glossophaga caudifer* was described by É. Geoffroy Saint-Hilaire (1818: 418), type locality Rio de Janeiro, Brazil. Cabrera (1958: 74) used the name *Anoura caudifera*.

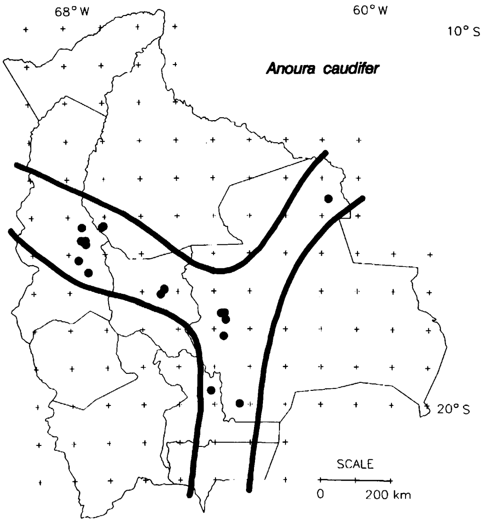


Fig. 547. Localities of known occurrence of *Anoura caudifer*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Forearm length, 34–39 mm; condylobasal length, 21–24 mm. The tail is very short. "Anterior lower premolar subequal to middle and posterior lower premolars. Upper canine not enlarged, its anterior face flat. Posterior upper premolar without a median internal cusp. Anterior upper molar without an anteroexternal cusp or crest" (Koopman, 1994: 82). Measurements in tables 8 and 9 are of specimens from 6.6 km downstream from Caranavi (AM 246468), 35 km N of Caranavi (AM 246467, 246469–246471, LSU 23109), and 47 km N of Caranavi (LSU 22958–22959, 22963).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 547.

No data for Bolivia are available on habitat, habits, behavior, or food.

REPRODUCTION: Two of three females with reproductive data each had a single embryo in July.

Scientific synonyms used for Bolivian specimens are:

Anoura caudifer: Anderson et al., 1982: 4. Anderson, 1985b: 7 (name in list). Anderson, 1993: 22 (general distributional records). Anderson et al., 1993: 22 (vicinity of Santa Cruz de la Sierra).

Anoura caudifera: Corbet and Hill, 1991: 63 (name in list).

Localities (20) and Specimens (42): **Beni:** 1515/6702, Serranía Pilón, 27 km by road N of río Quiquibay, 1 AM; 1517/6704, Serranía de Pilón, 3 AMNH, 1 CBF. **Chuquisaca:** 1938/6406, 16 km N of Monteagudo, 1 FM. **Cochabamba:** 1656/6523, 2 km E of Villa Tunari, 1 AM; 1657/6523, Las Pozas, Villa Tunari, 5 EBD; 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 1 MSB. **La Paz:** 1517/6737, Sararia, 1 LSU; 1538/6732, 47 km by road N of Caranavi, at Serrania Bellavista, 3 LSU; 1538/6739, 6.6 km downstream from Caranavi, 1 AM; 1540/6735, 35 km by road N of Caranavi, at Serrania Bellavista, 4 AM; 1544/6731, La Reserva, 2 AM; 1545/6731, 1 km S of La Reserva, 2 CBF; 1609/6744, Chijchijpa, 1224 m, 3 AM, 1 MSB; 1628/6728, Irupana, 1 CBF. **Santa Cruz:** 1433/6049, 17 km S of Campamento Los Fierros, 1 AM; 1734/6342, 3 km N and 13.5 km W of San Rafael de Amboró, río Saguayo, 1 MSB; 1735/6348, río Saguayo, 1 MNK (not seen); 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 4 AM, 1 MSB; 1811/6344, 1 km NE Estancia Cuevas, 1 MSB, 1 MNK; 1959/6318, 72 km ESE of Monteagudo, 1 FM.

Anoura cultrata Handley, 1960

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Anoura cultrata* was described by Handley (1960: 463), type locality "Tacarcuna Village, 3,200 ft., río Pucro, Darién, Panama." Nagorsen and Tamsitt (1981) discussed the content of the species.

Morphological Characters and Comparisons: Forearm length, 38–44 mm; condylobasal length, 22–26 mm. "Tail vestigial but present. Anterior lower premolar greatly enlarged (in relation to the middle and posterior lower premolars) and bladelike" (Koopman, 1994: 82). Measurements in tables 8 and 9 are of the two specimens noted below.

Distributional Notes: Known locality listed below and mapped in figure 548.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

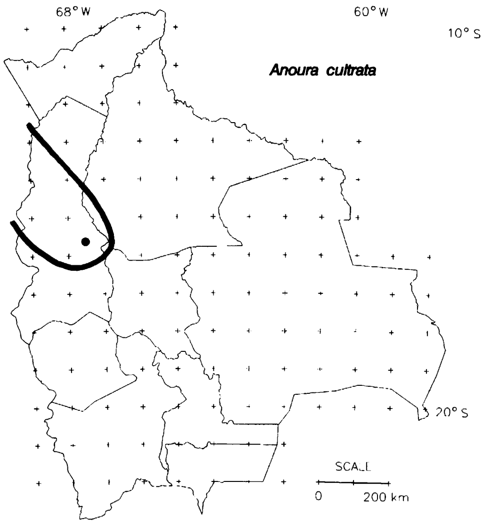


Fig. 548. Localities of known occurrence of *Anoura cultrata*.

Scientific synonym used for Bolivian specimens is:

Anoura cultrata: Tamsitt and Nagorsen, 1982: 3 (Bolivian record). Anderson et al., 1982: 4 (two specimens listed below). Anderson, 1985b: 7 (name in list). Emmons and Feer, 1990: 65 (mentioned Bolivia). Anderson, 1993: 22 (general distributional records).

Specimens examined, 2 (LSU 22960, 22962), from 1 locality. 1538/6732, Serranía Bellavista, 47 km by road N of Caranavi, at 1350 m elevation, in La Paz.

Anoura geoffroyi Gray, 1838

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Anoura Geoffroyi* was described by Gray (1838: 490); type locality Brazil restricted to "Rio de Janeiro" by Vieira (1942: 324). *Rhinchonycteris peruana* was described by Tschudi (1844: 71, pl. 3), type locality Peru. Cabrera (1958: 75) used the name *Anoura geoffroyi peruana*.

Morphological Characters and Comparisons: Forearm length, 39–47 mm; condylobasal length 24–26 mm. "Tail absent. Anterior lower premolar subequal to middle and posterior premolars. Upper canine not enlarged, its anterior face flat. Posterior upper premolar with a median internal cusp that

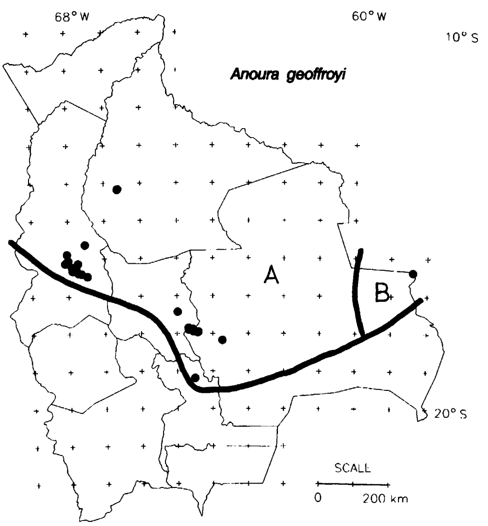


Fig. 549. Localities of known occurrence of two subspecies of *Anoura geoffroyi*, *A. g. geoffroyi* (B) and *A. g. peruana* (A).

protrudes from the narrow base of the tooth, remaining premolars narrow. Anterior upper molar with an anteroexternal cusp and crest" (Koopman, 1994: 82). Interfemoral membrane much reduced or absent.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 549.

No data for Bolivia are available on habitat, habits, behavior, or food.

REPRODUCTION: Two females, each with one embryo, were recorded in June.

Scientific synonyms used for Bolivian specimens are given under the subspecies below:

Anoura geoffroyi geoffroyi
Gray, 1838

Anoura geoffroyi geoffroyi: Sanborn, 1933: 26 (four from San Matías). Anderson et al., 1982: 4. Anderson, 1985b: 7 (name in list). Anderson, 1993: 22 (San Matías).

LOCALITIES (1) AND SPECIMENS (4): **Santa Cruz:** 1622/5824, San Matías, 3 CM, 1 FM.

Anoura geoffroyi peruana
(Tschudi), 1844

Anoura geoffroyi peruana: Anderson, 1985b: 7 (name in list). Anderson, 1993: 22 (general distributional records).

Anoura geoffroyi: Aguirre, 1994: 54 (specimen obtained in 1986 by Jaime Sarmiento at Espíritu).

LOCALITIES (24) AND SPECIMENS (79): **Beni:** 1413/6640, Espíritu, 1 CBF. **Chuquisaca:** 1911/6430, 34 km SE of Padilla, 1 FM. **Cochabamba:** 1725/6459, Yungas de Totora, 80 km N of Monte Punco, 2 IML; 1751/6440, 30 km W of Comarapa, 2 FM; 1751/6441, Siberia, 30 km W of Comarapa, 3 EBD. **La Paz:** 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 3 LSU; 1553/6802, 30 km by road N of Zongo, at cement mine, 4 UMMZ; 1603/6800, Zongo Valley, 2650 m elevation, 1 MNLP; 1607/6805, 0.5 km E of Saynani, 2 AM, 1 CBF, 1 MSB; 1608/6744, Chijchipa, 4 IE; 1613/6754, Cotapata, 3300 m elevation, 4 LSU; 1616/6747, Sacramento Alto, 2575 m elevation, 4 LSU; 1618/6748, 1 km S Chuspipata, 10 LSU; 1619/6753, río Aceromarca, 1 AM, 1 MSB; 1623/6743, Yanacachi, 1 IE; 1624/6738, Tarila, 1 IE; 1628/6728, Irupana, 1 AM; 22 IE (12 not examined). **Santa Cruz:** 1753/6433, El Tunal, 1 AM; 1754/6440, 25 km by road W of Comarapa, in Siberia Cloud Forest, 1 UMMZ; 1754/6434, 5 km W of Comarapa, 1 AM; 1757/6424, 6 km S and 10 km E of Comarapa, in Pulguina Valley, 2 AM; 1757/6432, 5 km SW of Comarapa, 2 AM; 1758/6425, 13 km by road SE of Comarapa, 1 AM; 1811/6344, 1 km NE Estancia Cuevas, 1 AM.

Measurements in tables 8 and 9 are of specimens from Sacramento Alto (LSU 23110–23113), the río Pulquina valley (AM 246472–246473), 5 km SW of Comarapa (AM 263192, 263193), and 13 km SE of Comarapa (AM 244620).

Genus *Choeroniscus* Thomas, 1928

TAXONOMIC REMARKS: The primary problems with the genus are (1) pronounced secondary sexual dimorphism, males being larger than females; (2) the availability of few specimens and some of these damaged because of the fragility of the skull; (3) no recent comprehensive revision.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Dental formula i2/0, c1/1, p2/3, m3/3, total 30. "Zygomatic arch incomplete. A distinct gap between anterior and posterior incisors. Upper premolars separated from one another and from canine, hardly exceeding molars in height. Pterygoids expanded at base and inflated, pterygoid wings long and more or less in contact with auditory bullae. Tail present but not extending beyond margin of uropatagium. Stylohyoideus muscle absent. Median circumvallate papillae absent" (Koopman, 1994: 82). Two of the four living species are tentatively identified in Bolivia.

Choeroniscus intermedius
Allen and Chapman, 1893

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Choeronycteris intermedia* was described by Allen and Chapman (1893: 207), type locality "Princestown, Trinidad," Trinidad and Tobago. K. F. Koopman has suggested the tentative assignment of one Bolivian specimen (AM 248759) to *C. intermedius*. This species is not included in the keys.

Morphological Characters and Comparisons: "Size fairly small (forearm length, 34–36 mm; condylobasal length, 20–23 mm). Postero-lateral margin of palate unnotched. Cranium relatively low. Rostrum fairly short and slender. Pterygoid inflation moderate" (Koopman, 1994: 82). Measurements in table 8 are of the specimen from the río Nareuda (AM 248759).

Distributional Notes: The known locality is noted below and mapped in figure 550.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

The only scientific name used for the Bolivian specimen is:

Choeroniscus minor: Anderson and Webster, 1983: 2 (río Nareuda).

Localities (1) and Specimens (1): **Pando:** 1117/6855, río Nareuda, 1 AM (248759).

Choeroniscus minor (Peters), 1968

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Choeronycteris minor* was described by Peters (1868: 366), type locality Surinam. Thomas (1928a: 123) first used the name *Choeroniscus minor*.

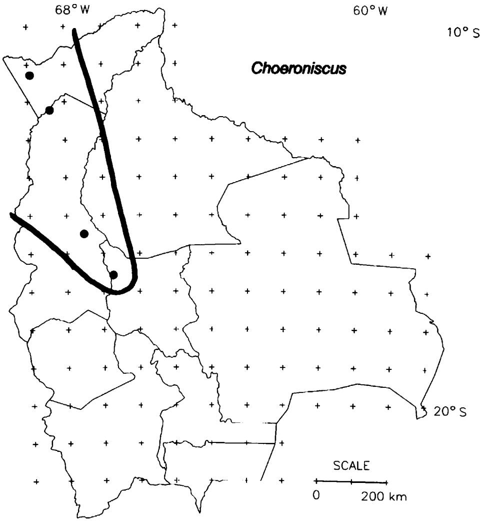


Fig. 550. Localities of known occurrence of the genus *Choeroniscus*. The northernmost locality is for *C. intermedius*, the others are for *C. minor*. Taxonomy is uncertain as noted in text.

Morphological Characters and Comparisons: "Size fairly large (forearm length, 33–38 mm; condylobasal length, 21–25 mm). Postero-lateral margin of palate unnotched. Cranium relatively low. Rostrum of median length and slender. Pterygoid inflation moderate" (Koopman, 1994: 82). Measurements in tables 8 and 9 are of a specimen from Santa Rosa (AM 262435).

Distributional Notes: Known localities are listed below and mapped in figure 550.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

Scientific synonym used for Bolivian specimens is:

Choeroniscus minor: Webster and Jones, 1980: 2 (specimen from Tomonoco). Anderson et al., 1982: 5. Webster and Fugler, 1984: 16 (Tomonoco). Anderson, 1985b: 7 (name in list). Anderson, 1993: 22 (general distributional records). Yensen et al., 1994: 406 (Seque Rancho).

Localities (3) and Specimens (3): **Cochabamba:** 1635/6645, Seque Rancho, río Cotacajes, Province of Ayopayo, 1 CBF. **La Paz:** 1529/6731, Tomonoco, 1 mi [= 1.6 km] W of Puerto Linares, 1 TTU. **Pando:** 1213/6824, Santa Rosa, 1 AM.

Genus *Glossophaga* É. Geoffroy Saint-Hilaire, 1818

Dental formula i2/2, c1/1, p2/3, m3/3, total 34. "Zygomatic arch complete [although sometimes broken away in preparation]. Upper premolars usually in contact, filling space between canine and anterior molar. Tail not extending to edge of uropatagium. Stylohyoideus muscle retained. Median circumvallate papillae of tongue retained" (Koopman, 1994: 80). Only one of the five living species is known from Bolivia.

Glossophaga soricina (Pallas), 1766

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Vespertilio soricinus* was described by Pallas (1766: 48); type locality originally unknown, restricted by Rehn (1902: 37) to "northern South America" and by Miller (1912b: 39) to Suriname. É. Geoffroy Saint-Hilaire (1818: 418) first used the name combination *Glossophaga soricina.*

Morphological Characters and Comparisons: "Upper incisors procumbent, anterior larger than posterior. Lower incisors large, in contact, and of equal size. Winglike lateral processes of pterygoids present. Presphenoid ridge well developed. Basisphenoid pits shallow. Anterior border of premaxillae elongate. Rostrum about equal to braincase in length. Mandibular symphyseal ridge prominent. Anterior upper molar with well-developed parastyle. Size fairly small (forearm length, 32–39 mm; condylobasal length, 19–22 mm)" (Koopman, 1994: 80). Measurements in tables 8 and 9 are of specimens from the río Quiser (AM 260957–260964) and Rurrenabaque (AM 247979–247991).

Distributional Notes: Known localities are listed below and mapped in figure 551.

Habits: In a study during the first 6 hours of darkness at Espíritu, Beni (Aguirre, 1994: 89), three individuals were netted between 1800 and 2000 and three between 2000 and 2200.

No data for Bolivia are available on habitat, behavior, or food.

Reproduction: Nine females each had a single embryo, taken in January (2), July (3), August (3), and September (1). Two females taken in July were recorded as lactating. Females without embryos were recorded in June (14), July (14), August (1), and November (1).

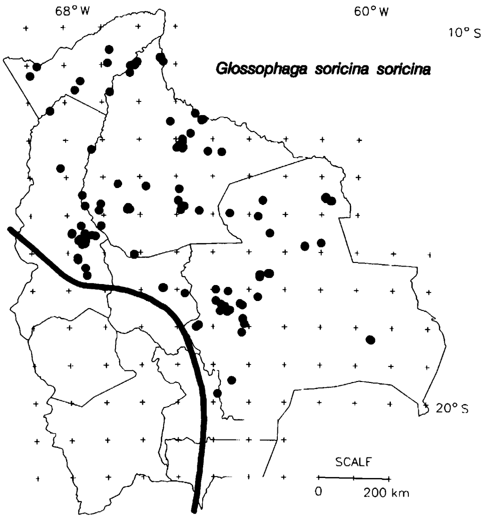


Fig. 551. Localities of known occurrence of *Glossophaga soricina soricina.*

Scientific synonyms used for Bolivian specimens are:

Glossophaga soricina soricina (Pallas), 1766

Glossophaga soricina: Dobson, 1878: 499 (Bolivia). Alston, 1879: 44 (Bolivia). Osgood, 1916: 212 (a specimen from Trinidad). Sanborn, 1932: 176 (two specimens from Santa Cruz de la Sierra). Barquez, 1977: 265 (7 km N of Santa Rosa). Ojeda and Barquez, 1978: 36 (24 specimens from 7 km N of Santa Rosa). Ibáñez, 1985: 331 (1636/6241). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Sawada and Harada, 1986: 368 (Cobija, San Juan). Wilson and Salazar, 1990: 49 (Estación Biológica del Beni). Hinojosa *in* Estenssoro, 1990 (collected in Chimane region). Emmons and Smith, 1992 (Centro Dieciocho). Hinojosa, 1992 (Serranía Eva Eva). Aguirre, 1994: 54 (two localities near Espíritu).

Glossophaga soricina soricina: Anderson et al., 1982: 4. Anderson and Webster, 1983: 2 (río Nareuda). Myers and Wetzel, 1983: 11. Barquez, 1984a: 218 (7 km N of Santa Rosa). Webster and Fugler, 1984: 16 (Tumichucua, Tomonoco, Caranavi). Anderson, 1985b: 7 (name in list). Alvarez et al., 1991: 1 (general biology of species). Anderson, 1993: 22 (general distributional records). Webster, 1993: 144 (20 Bolivian localities). Anderson et al., 1993: 21 (vicinity of Santa Cruz de la Sierra).

Localities (124) and Specimens (728): **Beni:** 1049/6525, Guayaramarin, 3 AM; 1051/6523, 5 km S of Guayaramarin, on río Mamoré, 2 AM; 1055/6602, 10 km NNE of Riberalta, 1 US; 1056/6520, 8 km N of Santa Cruz, 1 AM; 1059/6606, Riberalta, in province of Vaca Diez, 3 US; 1113/6614, Tumichucua, 30 LSU; 1144/6647, boca del río Biata, 1 AM, 1 MSB; 1219/6428, Puerto Acre, opposite bank from, 1 AM; 1229/6415, 4 km above Costa Marques [Brazil], 4 AM; 1229/6418, 1.5 km below Costa Marques, 1 AM; 1230/6418, mouth of río Baures, 3 AM; 1232/6509, 17 km NNW of Nuevo Berlin, 3 AM; 1251/6436, La Esperanza, 6 FM; 1300/6449, Aguadulce, 2 FM; 1304/6449, San Joaquín, 1 AM, 41 FM; 1310/6455, Veinte y Dos, 1 AM; 1313/6448, Barranquita, 13 FM; 1314/6459, Yuatre, 1 FM; 1315/6449, Yutiole, 8 AM; 1315/6718, río Beni, 4 AM, 2 MSB; 1320/6408, Magdalena, 1 FM; 1321/6345, El Mojon, 1 FM; 1406/6622, isla de bosque Espíritu Viejo (Aguirre, 1994: 66); 1408/6621, Espíritu, 4 IE (5, Aguirre, 1994: 66); 1415/6550, Camiare, Yacuma, 7 EBD; 1420/6455, 10 km W of San Pedro, 1 AM; 1428/6734, Rurrenabaque, 98 AM; 1438/6457, río Ibare, 1 km above mouth, 1 AM; 1442/6704, 45 km N of Yacuma, 1 MSB; 1446/6451, río Ibare, 24 km from mouth, 1 AM; 1447/6447, Trinidad, 1 FM, 1 MSU (not seen); 1447/6451, Puerto Almacen, 6 AM; 1448/6619, Campamento El Trapiche, 2 MNLP; 1451/6617, río Matos, 6 km E of Estación Biológica del Beni, 1 AM; 1451/6621, río Curiraba, Estación Biológica del Beni, 1 MNLP, 4 US; 1451/6621, Estación Biológica del Beni, 1 CBF; 1451/6621, Totaisal, 1 EBD; 1452/6707, Km [marker] 35, NW of Yucumo, 3 MSB; 1453/6453, 15 km SE of Puerto Julio, 2 AM; 1454/6422, 6 km W of Casarabe, 1 AM; 1517/6704, Serranía de Pilón, 1 AM, 1 CBF, 1 MSB; coordinates unknown, Centenela, 2 FM; coordinates unknown, Alto Beni, 1 AM; 1602/6610, Oromomo, 2 CBF; coordinates unknown, 15 km NW of río Sécure, TIPNIS, 1 CBF. **Chuquisaca:** 1946/6353, 70 km SE of Padilla, 1 FM. **Cochabamba:** 1657/6522, 4 km SE of Villa Tunari, 1 UMMZ; 1657/6524, 0.5 km NE of Villa Tunari, 2 UMMZ; 1706/6447, Sajta, 4 AM, 4 CBF, 4 MSB. **La Paz:** 1315/6718, río Beni, 4 AM; 1345/6809, Ixiamas, 1 MNLP; 1445/6730, río Quiquibey, 1 MNLP; 1517/6737, Sararia, 2 UMMZ, 15 LSU; 1528/6752, Guanay, 2 AM; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 9 MSU, 8 TTU (Webster and Fugler, 1984, Tomonoco); 1530/6753, Chimasi, 9 BM (7 examined); 1532/6720, Sapecha, 4 CBF; 1533/6714, 6 km from Palos Blancos or old road to San Borja, 1 CBF; 1538/6739, 6.6 km downstream from Caranavi, in valley of río Coroico, 5 AM; 1540/6742, 4 km NW of Alcoche, 39 UMMZ; 1542/6735, 20 km NNE of Caranavi, 2 UMMZ; 1544/6731, La Reserva, 840 m, 5 AM, 2 CBF; 1545/6731, 1 km S of La Reserva, 1 CBF; 1546/6736, Caranavi, 1 AM, 18 MSU, 14 TTU (Webster and Fugler, 1984); 1608/6744, Chijchipa, 9 IE; 1608/6744, 3 km N of Coroico, comunidad Marka, 1 AM; 1609/6744, Chijchijpa, 1224 m, 15 AM, 9 CBF, 7 MSB; 1610/6744, Coroico, 1 IE; 1611/6743, Camino Caranavi—Coroico, = 4 km from Coroico on road to Caranavi, 1 EBD; 1624/6731, Chulumani, 1 BM (skull not examined); 1636/6729, Pasto Grande, 1 MNLP; 1623/6743, Yanacachi, 2 IE. **Pando:** 1036/6647, Centro Dieciocho (Emmons and Smith, 1992); 1057/6603, left bank of río Beni, 2 AM, 1 MSB; 1057/6650, Ingavi on río Orton, 1 CBF, 1 US; 1101/6606, W bank río Beni, opposite Hamburgo, 1 AM; 1102/6613, Puerto Candelaria, 1 MNLP; 1101/6612, Agua Dulce, 1 AM; 1102/6844, Cobija, 2 (Sawada and Harada, 1986: 369); 1117/6855, río Nareuda, 12 AM; 1126/6734, Independencia, 1 MSB; 1140/6743, San Miguel, 1 CBF; 1213/6824, Santa Rosa, 1 MSB. **Santa Cruz:** 1432/6053, Parque Nacional "Noel Kempff Mercado," 4 AM; 1433/6053, Los Fierros, 1 EBD; 1434/6053, 3 km S of Campamento Los Fierros, 8 AM, 13 MNK, 12 MSB; 1438/6043, 27.5 km S of Los Fierros, 1 MSB; 1438/6045, 23 km S of Campamento Los Fierros, 1 AM; 1438/6237, Perseverencia, 1 MNK; 1458/6332, Laguna Pajaral, 2 MNK; 1503/6245, río Negrillo, 1 MNK; 1530/6225, Puerto Almacen, 1 MNK; 1433/6054, Camp "los Fierros," 4 AM; 1545/6100, Los Palmares, 12 MNK; 1550/6127, Santa Rosa de la Roca, 1 MSB; 1551/6127, 2 km SSE of Santa Rosa de la Roca, 2 MSB; 1634/6225, río Quiser on road from San Ramon to Concepción, 8 AM; 1634/6228, San Ramón, Castedo, 8 MNK; 1635/6225, 2 km N and 10 km E of San Ramón, 4 AM; 1636/6241, Finca La Laguna, 2 EBD; 1636/6242, 10 km N of San Ramón, 7 AM; 1640/6242, 10 km E of San Ramón, 13 AM, 16 MNK, 14 MSB; 1700/6355, Ayacucho, 2 AM; 1703/6335, 7 km N of Santa Rosa, 19 AM (+ 5, Ojeda and Barquez, 1978; Barquez, 1984a: 218, 2 IML); 1712/6245, 1 km SE of Puerto Pacay, 1 MSB; 1718/6355, San Juan, 4 (Sawada and Harada, 1986: 368); 1723/6315, 3 km S of Montero, 1 AM, 2 MSB; 1724/6346, 25 km W of Buenavista, on west bank of río Yapacaní, 1 UMMZ; 1725/6311, 10 km S of Montero, 1 Hayward collection, 1 MNK, 7 MSB; 1727/6340, Buenavista, 4 AM, 4 MACN (not examined); 1728/6341, 4 km W of Buena Vista, 2 MSB; 1728/6342, 4 km SW of Buena Vista, 2 MSB; 1733/6332, 2 km S of Caranda, 1 MNK, 6 MSB; 1735/6348, río Saguayo, Parque Amboró, 1 MNK; 1736/6336, San Rafael de Amboró, 2 MSB; 1747/6310, Santa Cruz Zoo [netted on the grounds], 1 AM, 3 MSB; 1748/6310, Santa Cruz de la Sierra, 2 CM, 1 MSB; 1755/6308, 15 km S of Santa Cruz, 2 MSB; 1757/6424, 6 km S and 10 km E of Comarapa, in valley of río Pulquina, 2 AM; 1800/6428, 2.5 km N of Tambo, 1 AM; 1809/6312, Los Tajibos, 2 km N and 7 km E of Ingeniero Mora, 5 MSU (not seen); 1818/5936, 3 km by road S and 3 km by road W of Santiago de Chiquitos, 3 AM; 1819/5934, Santiago, in Chiquitos Province, 3 FM; 1925/6329, 10 km E of Gutierrez, at Laguna Caucaya, 2 AM; coordinates unknown, Nueva Moka, 4 MACN (3 not examined).

Genus *Lichonycteris* Thomas, 1895

Dental formula i2/0, c1/1, p2/3, m2/2, total 26. "Zygomatic arch more or less complete. Upper premolars separated from canine and may be from one another. Tail not extending to edge of uropatagium. Stylohyoideus muscle retained. Median circumvallate papillae of tongue retained. Upper molar pattern variable, but W-shaped ectoloph always considerably modified" (Koopman 1994: 81). Only one species is recognized in this genus.

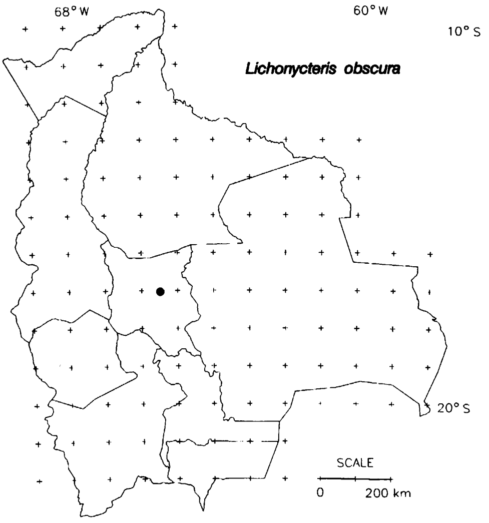


Fig. 552. Locality of known occurrence of *Lichonycteris obscura*.

Lichonycteris obscura Thomas, 1895

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Lichonycteris obscura* was described by Thomas (1895: 55), type locality Managua, Nicaragua. This name was used in a list by Corbet and Hill (1991: 62). Koopman (1994: 81) provided general characters and distributional data.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 8 and 9 are of the single Bolivian specimen.

DISTRIBUTIONAL NOTES: In Bolivia, known from only one locality, see map in Figure 552.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Lichonycteris obscurus: Hill, 1985: 581. Anderson, 1993: 22 (specimen from near Villa Tunari). Koopman, 1994: 169 (photo of skull, AMNH 244621).

Lichonycteris degener: Anderson et al., 1982: 4 (one specimen). Anderson, 1985b: 7 (name only).

Lichonycteris spp.: Emmons and Feer, 1990: 65 (mentioned northeastern Bolivia).

Only one Bolivian specimen (AM 244621) is known, from "3" (actually closer to 13) km SW of Villa Tunari in Cochabamba (1702/6529).

SUBFAMILY CAROLLIINAE MILLER, 1924

Dental formula i2/2, c1/1, p2/2, m3/3, total 32. "Upper incisors and canine not bladelike [as in vampires]. Noseleaf well-developed with a prominent upright portion. Tongue not [as in Glossophaginae] . . ., its musculature exhibiting a transverse pattern in section, supplied by paired longitudinal arteries . . .. Anterior upper premolar in contact with canine and with posterior premolar. Zygomatic arch incomplete. Upper molars more or less simplified, without a W-shaped ectoloph" (Koopman, 1994: 83).

Genus *Carollia* Gray, 1838

Members of the genus are sometimes termed short-tailed bats. "Tail present. Upper premolars approximately equal in size. Upper molars still showing a tritubercular pattern. Lower molars clearly distinct from lower premolars" (Koopman, 1994: 84). Three of the four living species are known from Bolivia.

Carollia brevicauda (Schinz), 1821

There is no unique vernacular name for this species, although short-tailed fruit bat has been used.

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia; *Phyllost.*[*oma*] *bernicaudum* [a misprint for *brevicaudum*] was described by Schinz (1821: 164); type locality "*Fazenda* von *Coroaba* in den grosser Wäldern an den Ufern des kleinen Flusses *Jucú* unweit des Río do Espirito Santo," Brazil, according to Pine (1972: 29).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size medium (forearm length, 37–43 mm; condylobasal length, 18–22 mm; maxillary toothrow length, 6.7–7.7 mm). Labial margin of maxillary toothrow without a distinct notch but slightly concave. Crown of anterior lower molar not extremely low. Outer lower incisors not reduced, not concealed dorsally by cingula of canines. Mandible somewhat V-shaped. Pelage long and thick" (Koopman, 1994: 84). Measurements in tables 8 and 9 are of specimens from Serranía Pilón (AM 260969–260982) and 35 km N of Caranavi (AM 246503–246504, 246506, 246508, 246510–246511, 246517, 246521).

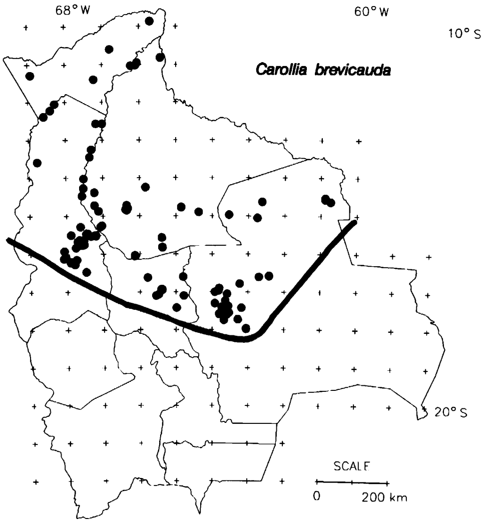


Fig. 553. Localities of known occurrence of *Carollia brevicauda.*

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 553.

No data for Bolivia are available on habitat, habits, behavior, or food.

REPRODUCTION: Data for 22 females include five with one embryo each, taken in August (2) and September (3). Nonpregnant females were recorded in March (1), May (2), June (3), July (6), and August (3).

Scientific synonyms used for Bolivian specimens are:

Hemiderma brevicauda: Dobson, 1878: 494 (Bolivia).

Carollia brevicauda: Pine, 1972: 29 (discussion of name, specimens from Buenavista and río Palometillas). Anderson et al., 1982: 5. Anderson and Webster, 1983: 2 (río Nareuda). Barquez, 1984a: 217 (río Yanimayo, 1725/6459). Webster and Fugler, 1984: 16 (Tomonoco). Anderson, 1985b: 7 (name in list). Ibáñez, 1985: 330 (1658/6349). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Sawada and Harada, 1986: 368 (Buenavista, San Juan, Nueva España, Chivé). Wilson and Salazar, 1990: 49 (Estación Biológica del Beni). Hinojosa *in* Estenssoro, 1990 (collected in Chimane region). Emmons, 1991: 72 (Alto río Madidi in

La Paz department). Emmons and Smith, 1992 (0952/6542, 1036/6647). Hinojosa, 1992 (Serranía Eva Eva). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Anderson, 1993: 23 (general distributional records). Anderson et al., 1993: 22 (vicinity of Santa Cruz de la Sierra).

Carollia perspicillata: Barquez, 1977 (the 44 specimens at AM from 7 km N of Santa Rosa included two species, 11 were *brevicauda*). Ibáñez and Ochoa, 1989: 216 (mentioned specimen from 38 km E of La Florida).

LOCALITIES (100) AND SPECIMENS (413): **Beni:** 1049/6525, Guayaramarin, 1 AM; 1327/6721, río Beni, 2 AM; 1415/6550, Venecia, 2 EBD; 1423/6714, 50 km by road N of Yacuma, 1 AM, 1 CBF; 1443/6621, 15 km N of El Porvenir, 1 IE; 1443/6714, 50 km N of Yacumo, on road to Rurrenabaque, 2 AM; 1428/6734, Rurrenabaque, 2 AM; 1446/6451, río Ibare, 24 km from mouth, 1 AM; 1447/6451, río Ibare, 26 km from mouth, 1 AM; 1448/6619, El Trapiche, 2 IE; 1450/6623, Beni Reserve, río Curiaba, 2 CBF, 3 US; coordinates unknown, EBB, 1 CBF; 1452/6707, Km 35, NW of Yucumo, 1 AM, 2 MSB; 1451/6621, río Curiraba, Estación Biológica del Beni, 4 MNLP, 3 US; 1454/6422, 6 km W of Casarabe, 3 AM; 1515/6702, Serranía Pilón, 27 km by road N of río Quiquibay, 14 AM; 1517/6704, Serranía de Pilón, 5 AM, 6 CBF, 3 MSB; 1533/6714, 6 km on old road from Palos Blancos to San Borja, 1 CBF; coordinates unknown, 6 km camino a [on the road to] Yucumo "El Charal," 3 IE; coordinates unknown, Alto Beni, 1 AM, 1 MSB, 2 CBF; 1602/6610, Oromomo, 1 CBF; 1545/6523, Puerto San Lorenzo on río Secure, 1 CBF; 1536/6523, 15 km down river from Puerto San Lorenzo, 1 CBF. **Cochabamba:** 1637/6547, 50 km by road NW of Villa Tunari, 6 UMMZ; 1656/6523, 2 km NE of Villa Tunari, 4 UMMZ; 1656/6524, 2 km N of Villa Tunari, 2 UMMZ, and one not seen; 1657/6523, Balneario Las Pozas, Villa Tunari, 1 EBD; 1657/6524, 0.5 km NE of Villa Tunari, 2 UMMZ; 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 3 AM, 2 CBF, 1 MSB; 1706/6447, Sajta, 1 AM, 1 CBF, 1 MSB; 1706/6533, El Palmar, río Cochi Mayu, 3 AM, 2 CBF, 2 MSB; 1725/6459, río Yanimayo, 80 km N of Monte Punco, 1 (Barquez, 1984a); coordinates unknown, Sehuenca, 1 MNK. **La Paz:** 1234/6700, río Madidi, 8 km from mouth, 1 AM; 1234/6710, Santa Ana de Madidi, 1 MSB; 1315/6718, río Beni, 1 AM; 1335/6846, Campamento Moire, Alto río Madidi, 3 IE (Emmons, 1991: 72); 1401/6731, río Beni, 1 AM; 1416/6732, río Beni, 1 AM; 1517/6737, 20 km by river N Puerto Linares, 9 LSU; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 1 TTU; 1530/6753, Chimasi, Yungas, 5 BM; 1532/6720, Sapecho, 3 CBF; 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 38 LSU; 1538/6739, 6.6 km downstream from Caranavi, in valley of río Coroico, 1 AM; 1540/6735, 35 km by road N of Caranavi, at Serranía Bellavista, 12 AM, 19 LSU; 1540/6742, 4 km NW of Alcoche, 6 UMMZ; 1545/6731, 1 km S of La Reserva, 7 CBF; 1546/6736, Caranavi, 3 AM; 1550/6745, río Zongo, 1500 m elevation, 9 AM; 1555/6804, 30.7 km by road downstream from Lago Zongo in valley of río Zongo, 4 AM; 1605/6802, El Vertigo, Zongo Valley, 1 AM; 1 IE; 1607/6805, 0.5 km E of Saynani, 1 AM, 2 MSB; 1609/6744, Chijchijpa, 1224 m elevation, 3 AMNH, 1 CBF, 1 MSB; 1612/6754, Sandillani, 6 EBD; 1613/6754, Cotaata, 2 LSU; 1616/6747, 8 km by road N of Chuspipata, at Sacramento Alto, 13 LSU; 1628/6728, Irupana, 5 IE; 1630/6728, 3 km S of Irupana, 1 CBF. **Pando:** 0952/6542, main camp on río Negro (Emmons and Smith, 1992); 1036/6647, Centro Dieciocho (Emmons and Smith, 1992); 1057/6603, left bank of río Beni, 1 AM; 1101/6606, W bank río Beni, opposite Hamburgo, 2 MSB; 1102/6613, Puerto Candelaria, río Madre de Dios, 1 CBF; 1117/6855, río Nareuda, 9 AM; 1124/6713, La Cruz, 1 AM; 1203/6817, Humaita, 2 CBF; 1213/6824, Santa Rosa, 2 MSB; 1223/6835, Chivé, 6 (Sawada and Harada, 1986: 368, 369). **Santa Cruz:** 1432/6053, Parque Nacional Noel Kempff Mercado, 1 MNK; 1434/6053, 3 km S of Campamento Los Fierros, 2 AM, 1 MSB; 1438/6044, 27.5 km S of Campamento Los Fierros, 1 AM; 1438/6237, Perseverencia, 1 MNK; 1458/6332, Pajaral, 1 MNK; 1503/6245, río Negrillo, 5 MNK; 1634/6225, río Quiser on road from San Ramón to Concepción, 1 AM; 1635/6225, San Ramón, Castedo, 3 MNK; 1636/6242, 10 km N of San

Ramón, 1 MSB; 1636/6448, río Ichilo, 70 km S of río Chapare mouth, 2 AM; 1647/6314, Estancia Cachuela Esperanza, 3 AM; 1654/6348, La Ponderosa, Santa Rosa, 1 EBD; 1658/6349, 25 km NW of Santa Rosa de Sara (Ibáñez, 1985); 1700/6355, Ayacucho, 1 AM; 1703/6335, 7 km N of Santa Rosa, in province of Sara, 11 AM, 1 CM; 1718/6355, San Juan, 1 (Sawada and Harada, 1986: 368); 1714/6338, 4.5 km N of Buen Retiro, 2 AM, 1 MSB; 1722/6333, río Palometillas, in province of Sara, 3 FM; 1724/6344, 7 km N and 17 km W of Buenavista, 7 AM; 1725/6311, 10 km S of Montero, 1 Hayward coll., 6 MSB; 1727/6340, Buenavista, 1 AM, 1 (Sawada and Harada, 1986: 368); 1728/6341, 4 km SW of Buenavista, 2 MSB; 1733/6332, 2 km S of Caranda, 14 MSB; 1734/6342, 3 km N and 13.5 km W of San Rafael de Amboro, río Saguayo, 4 AM, 3 MNLP; 1735/6348, río Saguayo, Amboró, 1 MNK; 1736/6336, San Rafael de Amboró, 18 AM, 7 MSB; 1744/6317, 8 km W of Santa Cruz, 1 MSB; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 2 AM; 1758/6303, 27 km SE of Santa Cruz, 4 MSB; coordinates unknown, Nueva Moka, 1 MACN; coordinates unknown, Palmasola, 16 km from Santa Cruz, 1 CBF.

Carollia castanea H. Allen, 1890

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Carollia castanea* was described by Allen (1890: 19); type from Angostura, Costa Rica, according to Pine (1972: 18).

Morphological Characters and Comparisons: "Size relatively small (forearm length, 33–39 mm; condylobasal length, 16–19 mm). Labial margin of maxillary toothrow with a distinct notch. Crown of anterior lower molar extremely low. Outer lower incisors somewhat reduced but not concealed dorsally by cingula of canines. Mandible somewhat U-shaped" (Koopman, 1994: 84). Measurements in tables 8 and 9 are of specimens from 2 km E of Villa Tunari (AM 248082, 248085–248089, 248092—248093), 50 km NW of Villa Tunari (UM 126726–126728, 126782–126784, 126786—126787, 126797), and Rurrenabaque (AM 248076–248081).

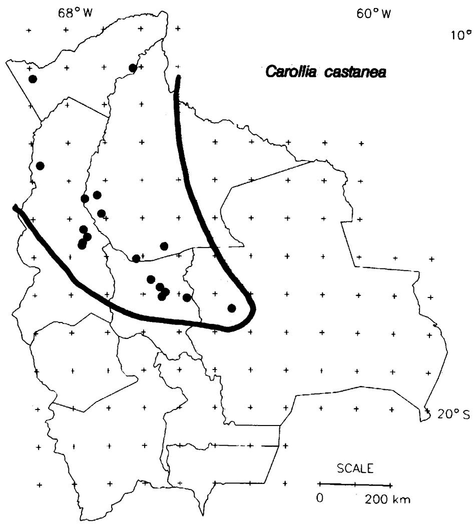


Fig. 554. Localities of known occurrence of *Carollia castanea*.

Distributional Notes: Known localities are listed below and mapped in figure 554.

No data for Bolivia are available on habitat, habits, behavior, or food.

Reproduction: Nonpregnant females recorded in May (1) and July (4). No other data.

Scientific synonym used for Bolivian specimens is:

Carollia castanea: Pine, 1972: 22 (one from "Aleoche" = Alcoche). Anderson et al., 1982: 5. Anderson and Webster, 1983: 2 (río Nareuda). Webster and Fugler, 1984: 16 (Tomonoco). Anderson, 1985b: 7 (name in list). Hinojosa *in* Estenssoro, 1990 (collected in Chimane region). Emmons, 1991: 72 (seen at Alto río Madidi in La Paz department). Hinojosa, 1992 (Serranía Eva Eva). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Anderson, 1993: 23 (general distributional records).

Localities (22) and Specimens (123): **Beni:** 1423/6714, 50 km N of Yacuma on road to Rurrenabaque, 2 AM, 2 CBF; 1428/6734, Rurrenabaque, 6 AM; 1452/6707, Km 35, NW of Yucumo, 1 AM, 1 CBF, 1 MSB; 1536/6638, Sierra Eva Eva, 2 IE; 1545/6523, San Lorenzo on río Sécure, 1 CBF; 1602/6610, Oromomo, 3 CBF; coordinates unknown, province of Moxos, TIPNIS, río Sécure, near mouth of río Iruplumo, 1 CBF; coordinates unknown, TIPNIS, río Sécure, Arroyo Arruya, 1 CBF **Cochabamba:** 1637/6547, 50 km by road NW of Villa Tunari, 9 UMMZ; 1649/6532, 20 km NW of Villa Tunari, 12 UMMZ; 1657/6523, Balneario Las Pozas, Villa Tunari, 12 EBD; 1657/6523, 2 km E of Villa Tunari, 12 AM; 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 2 AM, 1 CBF, 1 MSB; 1706/6447, Sajta, 1 MSB. **La Paz:** 1335/6846, Moire, Alto río Madidi (Emmons, 1991: 72), 3 IE; 1517/6737, 20 km by river N Puerto Linares, 24 LSU; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 8 MSU, 7 TTU (Webster and Fugler, 1984, Tomonoco); 1538/6739, 6.6 km downstream from Caranavi, in valley of río Coroico, 3 AM; 1542/6740, Alcoche, 1 FM. **Pando:** 1102/6613, Puerto Candelaria, río Madre de Dios, 1 CBF; 1117/6855, río Nareuda, 4 AM. **Santa Cruz:** 1723/6332, San Miguel Rincón, 1 AM.

Carollia perspicillata
(Linnaeus), 1758

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia; *V[espertilio] perspicillatus* was described by Linnaeus (1758: 31); type locality restricted to Surinam by Thomas (1911c: 130).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size relatively large (forearm length, 39–47 mm; condylobasal length, 19–23 mm, maxillary toothrow length, 7.2–8.0 mm). Labial margin of maxillary toothrow without a distinct notch and relatively straight. Crown of anterior lower molar not extremely low. Outer lower incisors more or less reduced, tending to be concealed dorsally by cingula of canines. Mandible more or less V-shaped" (Koopman, 1994: 84). Measurements in tables 8 and 9 are of specimens from 6 km W of Casarabe (AM 255886–255893, 255895—255899, 255902–255903). Weights are from 12 to 25 g, mostly in the middle of that range.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 555.

HABITS: In a study during the 12 hours of darkness at Espíritu, Beni (Aguirre, 1994: 89), individuals were netted at various times throughout the night.

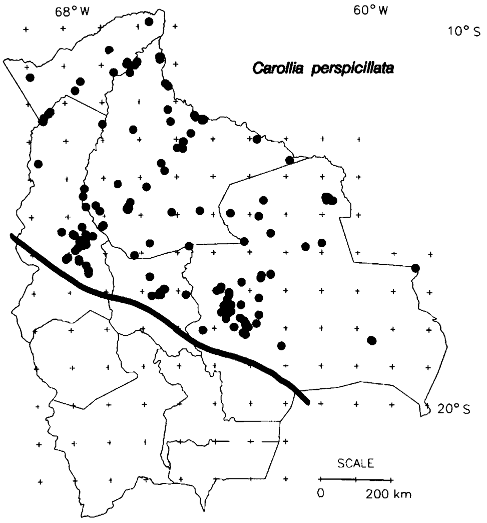


Fig. 555. Localities of known occurrence of *Carollia perspicillata*.

No data for Bolivia are available on habitat, behavior, or food.

PARASITOLOGY: Brennan (1970: 811) reported the chigger, *Hooperella vesperuginis*, from the mouth of the Baures River and from opposite of Costa Marques. The host was cited as *Carollia subrufa*, but all of the specimens of *Carollia* from these two localities are now identified as *C. perspicillata*.

REPRODUCTION: Pregnant females (one embryo each) were recorded in January (2), July (3), August (1), September (2), and October (1). A female carrying a young one was taken in February.

Scientific synonyms used for Bolivian specimens are:

Carollia perspicillata perspicillata: Sanborn, 1932: 177 (two localities in Santa Cruz). Webster and Fugler, 1984: 16 (Tumichucua, Tomonoco, Caranavi, Serranía Bella Vista).

Carolia perspicillata: Arce Pereira et al., 1963: 152 (name in list; Todos Santos).

Carollia subrufa: Brennan, 1970: 811 (chiggers, mouth of Baures River).

Carollia perspicillata: Pine, 1972: 74 (five localities). Barquez, 1977. Ojeda and Barquez, 1978: 36 (reported 56 specimens, 44 of which are at AM and 33 are *C. perspicillata*). Ibáñez, 1981: 101 (map). Anderson et al., 1982: 5. Anderson and Webster, 1983: 2 (río Nareuda, Tumichucua). Myers and Wetzel, 1983: 12 (Buenavista). McLellan, 1984: 8 (Buenavista). Anderson, 1985b: 7 (name in list). Ibáñez, 1985: 330 (1636/6241, 1658/6349, 1707/6544). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Sawada and Harada, 1986: 368 (Buenavista, San Miguel, Nueva España, Chivé). Ibáñez and Ochoa, 1989: 216 (38 km E of La Florida), 219 (Espejillos). Wilson and Salazar, 1990: 50 (Estación Biológica del Beni). Hinojosa *in* Estenssoro, 1990 (collected in Chimane region). Emmons, 1991: 72 (Alto río Madidi in La Paz department). Emmons and Smith, 1992 (0952/6542, 1036/6647). Cloutier and Thomas, 1992 (summary of species). Hinojosa, 1992 (Serranía Eva Eva). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Anderson, 1993: 23 (general distributional records). Anderson et al., 1993: 22 (vicinity of Santa Cruz de la Sierra). Aguirre, 1994: 55 (four localities near Espíritu). Aguirre and Urioste, 1994: 74 (Arroyo Hermoso, 1113/6742).

LOCALITIES (180) AND SPECIMENS (1597): **Beni**: 1048/6525, 1.5 km N of Guayaramarin, on island in río Mamoré, 3 AM; 1048/6526, 1.5 km NW of Guayaramarin, 1 AM; 1049/6525, Guayaramarin, 11 AM; 1052/6525, 5 km S of Guayaramarin, 5 AM; 1055/6602, 10 km NNE of Riberalta, in province of Vaca Diez, 1 US; 1113/6614, Tumichucua, 9 LSU; 1131/6517, 5 km S of Coimbra, 1 AM; 1134/6513, 5 km SW of Buena Hora [Brazil], 1 AM; 1136/6512, 6 km S of Buena Hora, on island in Arroyo Mercedes, 1 AM; 1213/6513, opposite Cascajal, on east bank of río Mamoré, 1 AM; 1222/6430, 5 km NW of Principe da Beira, between Bahia da Ducy and Casa Alta, 1 AM; 1225/6428, opposite Principe da Beira [Brazil], on west bank of río Iténez, 1 AM; 1229/6415, 4 km above Costa Marquez, on río Iténez, 4 AM; 1229/6417, opposite Costa Marquez [Brazil], on south bank of río Iténez, 3 AM; 1229/6418, 1.5 km below Costa Marquez, on río Iténez, 1 AM; 1230/6415, Pampa de Meio, 1 AM; 1230/6418, mouth of río Baures, 6 AM; 1232/6509, 17 km NNW of Nuevo Berlin, 4 AM; 1244/6610, Versalles, 2 AM; 1251/6436, La Esperanza, 4 FM; 1301/6248, Mategua, 1 AM; 1304/6448, Camino Vilches, on río Machupo, 8 FM; 1304/6449, San Joaquín, 21 FM; 1314/6459, Yuatre, 8 FM; 1315/6449, Yutiole, 10 AM; 1 FM; 1334/6154, Remansos, 1 km below mouth of río Paragua, 3 AM; 1338/6525, río Yacuma, 2 km from mouth, 2 AM; 1350/6520, río Mamoré, on east bank, 1 AM; 1413/6640, Espíritu, 1 IE (also two localities near 1410/6640, 2 specimens, and 1411/6638, 4 specimens; Aguirre, 1994: 66); 1415/6550, Venecia, 1 EBD; 1416/6732, río Beni, 1 AM; 1428/6734, Rurrenabaque, 19 AM; 1439/6617, Campamento Busurucucú, 2 CBF; 1443/6714, 50 km N of Yacumo, on road to Rurrenabaque, 10 AM; 1446/6621, Campamento La Pascana, 1 AM, 2 IE; 1448/6619, Campamento El Trapiche, 1 AM, 6 IE; 1450/6622, Los Tajibos, 40 km E of San Borja, 2 EBD; 1450/6623, río Curireba, 3 CBF, 1 US; 1450/6623, 5 km N of Porvenir, 1 CBF; 1451/6621, Estación Biológica del Beni, 1 IE, 1 US; 1451/6621, Florida, 1 EBD; 1451/6621, El Porvenir, 1 EBD; 1451/6621, río Matos, Totaisal, 1 km SW of Estación Biológica del Beni, 1 AM, 4 MNLP; 1451/6621, Totaisal, 2 EBD; 1451/6621, río Matos, 1 IE; 1452/6707, Km [marker] 35, NW of Yucumo, 1 AM, 2 CBF; 1454/6422, 6 km W of Casarabe, 15 AM; 1456/6509, río Tijamuchi, 1 MSB; 1515/6702, Serranía Pilón, 27 km by road N of río Quiquibay, 7 AM; 1517/6704, Serranía de Pilón, 6 AM, 9 CBF, 9 MSB; 1536/6638, Sierra Eva Eva, 2 IE; 1550/6441, 5 km NW of mouth of río Grande, 2 AM; 1602/6610, Oromomo, 3 CBF; coordinates unknown, río Curuya, at río Sécure, 1 CBF; 1545/6523, Puerto San Lorenzo on río Sécure, 2 CBF. **Cochabamba:** 1637/6547, 50 km NW of Villa Tunari, 15 UMMZ; 1657/6522, 4 km SE of Villa Tunari, 4 UMMZ; 1657/6522, Villa Tunari, bañado Las Posas, 8 MNLP; 1657/6523, Balneario Las Pozas, Villa Tunari, 22 EBD; 1657/6523, 2 km E of Villa Tunari, 30 AM; 1657/6524, 0.5 km NE of Villa Tunari, 12 UMMZ; 1702/6529, 3 km SW of Villa Tunari, 4 AM; 1702/6530, carreteria from Cochabamba to Villa Tunari, 15 km from Tunari, 1 EBD; 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 18 AM, 4 CBF, 18 MSB; 1704/6531, 19 km SW of Villa Tunari, at San Rafael, 30 UMMZ; 1706/6447, Sajta, 27 AM, 29 CBF, 22 MSB; 1706/6529, El Palmar, 1 MACN; 1706/6533, El Palmar, río Cochi Mayu, 5 AM, 2 CBF, 2 MSB; 1707/6544, Puerto Sillar, 2 EBD; coordinates unknown, Sehuencas, province of Carrasco, 4 MNK. **La Paz:** 1234/6700, río Madidi, 8 km from mouth, 2 AM; 1335/6846, Alto río Madidi, 1 IE (Emmons, 1991: 72); 1517/6737, Election, 11 UMMZ; 1517/6737, 20 km or 2 hours by river N (or NW) of Puerto Linares, 83 LSU; 1445/6730, río Quiquibey, 6 MNLP; 1524/6811, San Carlos (coordinates uncertain), 1 BM; 1528/6752, Guanay, 4 AM; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 17 MSU, 9 TTU (Webster and Fugler, 1984, Tomonoco); 1530/6750, 5 km SE of Guanay, on río Challana, 1 UMMZ; 1532/6720, Sapecho, 10 IE; 1538/6732, 47 km by road N of Caranavi, in Serranía Bellavista, 4 LSU; 1538/6739, 6.6 km downstream from Caranavi, in valley of río Coroico, 19 AM; 1540/6742, 4 km NW of Alcoche, 9 UMMZ; 1540/6735, 35 km by road N of Caranavi, in Serranía Bellavista, 17 AM, 12 LSU, 1 TTU; 1542/6735, 20 km NNE of Caranavi, 7 AM; 1542/6740, Alcoche, 1 FM; 1544/6731, La Reserva, 840 m, 27 AM, 9 CBF, 11 MSB; 1544/6735, 5 km NE of Caranavi, 1 IE; 1545/6731, 1 km S of Reserva, 6 CBF; 1546/6736, Caranavi, 1 AM, 1 CBF, 4 MSU, 5 TTU; 1554/6749, Zongo, 1880 m elevation, 1 CBF; 1550/6745, río Zongo, 1500 m elevation, 9 AM; 1554/6749, Zongo, province of Murillo, 1 CBF; 1605/6802, El Vertigo, Zongo Valley, 2 AM; 1607/6805, 0.5 km E of Saynani, 1 AM, 2 CBF; 1608/6744, Chijchipa, 3 IE; 1609/6744, Chijchijpa, 3 AM, 8 CBF, 6 MSB; 1611/6743, 4 km from Coroico, on road to Caranavi, 4 EBD; 1618/6732, río Solacama, ca. 14 km de Chulumani on road to Irupana, 1 CBF; 1628/6728, Irupana, 1 AM, 1 IE; 1630/6728, 3 km S of Irupana, 1 AM, 1 IE; 1626/6728, Lavi Grande, Campamento Qhana, 6 or 7 km S of Irupana, 2 AM; 3 CBF; coordinates unknown, Sapecho, 12, IE. **Pando:** 0952/6542, Main camp on río Negro (Emmons and Smith, 1992); 1036/6647, Centro Dieciocho, 2 CBF, 1 US (Emmons and Smith, 1992); 1056/6618, Remanso, 2 CBF; 1057/6603, left bank of río Beni, 2 AM; 1059/6619, left bank of río Madre de Dios, 1 MSB; 1101/6606, W bank río Beni, opposite Hamburgo, 1 MSB; 1101/6612, Agua Dulce, 11 AM, 1 CBF, 1 MSB; 1102/6613, Puerto Candelaria, 2 MNLP; 1112/6640, left bank río Madre de Dios, 2 AM; 1117/6855, río Nareuda, 44 AM; 1126/6734, Independencia, 1 AM, 1 MSB; 1140/6743, San Miguel, 1 CBF; 1213/6824, Santa Rosa, 10 AM, 4 MSB; 1216/6827, 8 km SO de [= SW of] Santa Rosa, 2 CBF; 1223/6835, Isla Gargantua, 1 MSB; 1223/6835, Chivé, 3 MNLP, 10 (Sawada and Harada, 1986: 368, 369); 1223/6835, Isla Gargantua, 5 AM, 3 MSB; 1228/6836, Nueva España, 1 (Sawada and Harada, 1986: 368). **Santa Cruz:** coordinates unknown, Mangaulito, Parque Nacional "Noel Kempff Mercado," 5 MNK; 1432/6053, Parque Nacional "Noel Kempff Mercado," 5 AM, 7 MSB; 1432/6054, Campamento Precámbrico, 3 km N of Los Fierros, 10 EBD; 1433/6049, 17 km S of Campamento Los Fierros, 3 MNK; 1433/6054, Camp "los Fierros," 1 AM, 6 EBD; 1434/6053, 3 km S of Campamento Los Fierros, 3 AM, 5 MNK, 3 MSB; 1436/6053, 38 km E of La Florida (Ibáñez and Ochoa, 1989); 1437/6053, Parque Nacional "Noel Kempff Mercado," 2 AM, 5 MSB; 1438/6042, El Encante, 2 CBF, 2 US; 1438/6044, 27.5 km S of Campamento Los Fierros, 2 AM, 2 MNK; 1438/6044, Km 55 E of Aserradero Moira, 7 EBD; 1438/6045, 23 km S of Campamento Los Fierros, 5 AM, 4 MNK; 1438/6237, Perseverencia, 1 MNK; 1458/6332, Pajaral, 1 MNK; 1503/6245, río Negrillo, 1 MNK; 1530/6225, Puerto Almacen, 16 MNK (3 not seen); 1543/6309, 6 km by road W of Ascención, 2 AM, 2 MNK, 1 MSB; 1545/6100, Los Palmares, 3 MNK; 1551/6127, 2 km SSE of Santa Rosa de la Roca, 1 MNK; 1622/5824, San Matías, 1 CM; 1634/6225, río Quiser on road from San Ramón to Concepción, 1 AM; 1635/6225, 2 km N and 10 km E of San Ramón, 4 AM, 1 MSB; 1635/6225, San Ramón, Castedo, 4 MNK; 1636/6241, La Laguna, 1 EBD (Ibáñez, 1985); 1640/6242, 10 km E of San Ramón, 14 AM, 10 MNK, 6 MSB; 1654/6348, La Ponderosa, Santa Rosa, 8 EBD; 1658/6349, 25 km NW of Santa Rosa de Sara (Ibáñez, 1985); 1647/6314, Estancia Cachuela Esperanza, 17 AM, 28 MSB, 17 MNLP; 1700/6355, Ayacucho, 3 AM, 1 MNK; 1703/6335, 7 km N of Santa Rosa, in province of Sara, 33 AM, 2 CM; 1705/6335, 2.5 km N of Santa Rosa del Sara, 3 MSB; 1705/6335, 2.4 km N of Santa Rosa del Sara, 1 MSB; 1707/6335, Santa Rosa de

Sara, 1 EBD; 1707/6335, province of Sara, 8 CM; 1712/6245, 1 km SE of Puerto Pacay, 5 MSB; 1714/6338, 4.5 km N of Buen Retiro, 10 AM; 1723/6315, 3 km S of Montero, 1 AM, 1 MSB; 1723/6332, San Miguel Rincón, 111 AM, 35 MSB, 34 (Sawada and Harada, 1986: 368); 1724/6344, 7 km N and 17 km W of Buenavista, 11 AM, 4 BM (not seen); 1727/6340, Buenavista, 9 AM, 2 CM, 8 FM, 2 LACM (Pine, 1972), 3 (Sawada and Harada, 1986: 368), 10 MACN (8 not examined); 1733/6332, 2 km S of Caranda, 1 MSB; 1734/6342, 3 km N and 13.5 km W of San Rafael de Amboró, río Saguayo, 1 AM, 1 MSB; 1735/6348, río Saguayo, 5 MNK; 1736/6336, San Rafael de Amboró, 9 AM, 4 MSB; 1736/6336, Parque Amboró, 4 MNK; 1739/6245, 3.5 km W of Estación Pailón, 2 AM; 1744/6317, 8 km W of Santa Cruz, 3 MSB; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama,5 AM, 1 MSB; 1748/6310, Santa Cruz, 1 CM, 1 MACN; 1748/6310, Santa Cruz de la Sierra, 3 CM; 1753/6249, Lomas de Arena, 6 MNK (5 not seen); 1753/6307, 15 km S of Santa Cruz, 1 MSB; 1755/6308, 15 km S of Santa Cruz, 8 MSB; 1758/6303, 27 km SE of Santa Cruz, 1 Hayward coll., 2 MSB; 1758/6327, Espejillos, 1 EBD (Ibáñez and Ochoa, 1989); 1803/6419, 5 km NE of Quiñe, 1 AM; 1808/6312, 7 km E and 3 km N of Ingeniero Mora, 3 AM; 1810/6308, 15 km E and 3 km N of Ingeniero Mora, 2 AM; 1818/5936, 3 km by road S and 3 km by road W of Santiago de Chiquitos, 7 AM; 1819/5934, Santiago, in province of Chiquitos, 24 FM; 1828/6207, 8 km SE of Tita, 1 AM; coordinates unknown, Nueva Moka, 21 MACN; coordinates unknown, Palmasola, 16 km from Santa Cruz, on road to Las Lomas, 1 CBF.

Carollia, species not determined

LOCALITIES (16) AND SPECIMENS (68): **Beni:** 1450/6623, río Curirabe, 4 MNLP (not seen); 1451/6621, El Porvenir, 1 IE; coordinates unknown, Alto Beni, 1 MSB. **Cochabamba:** 1706/6529, Palmar, 1 MACN. **La Paz:** 1416/6732, río Beni, 2 MSB; 1623/6743, Yanacachi, 1 IE. **Pando:** 1057/6603, left bank of río Beni, 1 MSB. **Santa Cruz:** 1530/6225, Puerto Almacen, 2 MNK; 1705/6335, 2.5 km N of Santa Rosa del Sara, 3 MSB; 1728/6342, 4 km SW of Buena Vista, 2 MSB; 1733/6332, 2 km S of Caranda, 14 MSB; 1735/6348, rio Saguayo, 1 MNK; 1736/6336, San Rafael de Amboró, 4 MSB; 1753/6249, Lomas de Arena, province of Andrés Ibáñez, 4 MNK (not seen); coordinates unknown, Nueva Moka, 23 MACN; coordinates unknown, Parque Amboró, 4 MNK.

Genus *Rhinophylla* Peters, 1865

"Tail absent. Anterior upper premolar much smaller than posterior. Upper molars greatly reduced medially. Lower molars so reduced as to be similar to lower premolars" (Koopman, 1994: 84). Only one of the three species is known to occur in Bolivia.

Rhinophylla pumilio Peters, 1865

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Rhinophylla pumilio* was described by Peters (1865a: 355); type locality "Angeblich Brasilien" restricted by Cabrera (1958: 77) to "Baia," Brazil.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "First upper incisor relatively broad and with three or four well-defined lobes; no gap between upper incisors and canine. Margin of uropatagium virtually naked. Size medium (forearm length, 32–35 mm; condylobasal length, 16–18 mm)" (Koopman, 1994: 84). Measurements in tables 8 and 9 are of specimens from 1 mi W of Puerto Linares (MSU 32895–32900), río Nareuda (AM 248892), and Agua Dulce (AM 262421–262423, 262468–262471; MSB 57017–57018).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 556.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Rhinophylla pumilio: Webster and Jones, 1980: 3 (12 specimens from Tomonoco). Anderson et al., 1982: 6. Anderson and Webster, 1983: 2. Webster and Fugler, 1984: 16 (Tomonoco). Anderson, 1985b: 7 (name in list). Hinojosa *in* Estenssoro, 1990 (collected in Chimane region). Emmons and Smith, 1992 (0952/6542, 1036/

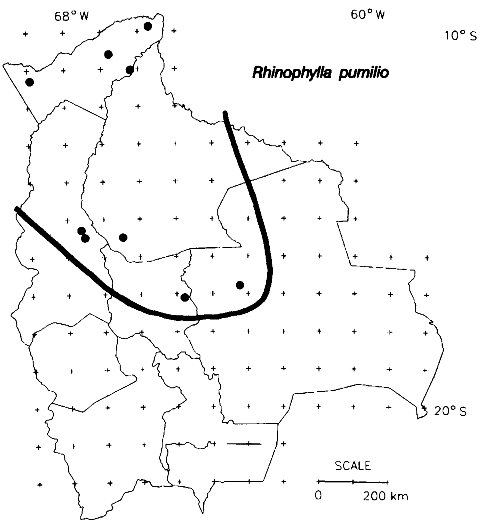


Fig. 556. Localities of known occurrence of *Rhinophylla pumilio.*

6647). Anderson, 1993: 23 (general distributional records).

Rhynophylla pumilio: Hinojosa, 1992 (misspelling, Serrania Eva Eva).

LOCALITIES (10) AND SPECIMENS (45): **Beni:** 1529/6628, Eva Eva, 1 IE. **Cochabamba:** 1706/6447, Sajta, 1 AM. **La Paz:** 1517/6737, 20 km by river N Puerto Linares, 6 LSU; 1529/6731, 1 mi [= 1.6 km] W Puerto Linares, 6 MSU, 6 TTU; 1529/6731, Tomonoco, 12 (Webster and Jones, 1980; perhaps these include the above 6 from Linares). **Pando:** 0952/6542, Main camp on río Negro (Emmons and Smith, 1992); 1036/6647, Centro Dieciocho, 1 CBF (Emmons and Smith, 1992); 1101/6612, Agua Dulce, 7 AM, 2 MSB; 1117/6855, río Nareuda, 1 AM. **Santa Cruz:** 1647/6314, Estancia Cachuela Esperanza, 1 AM.

SUBFAMILY STENODERMATINAE GERVAIS *in* CASTELNAU, 1855: 32

TAXONOMIC REMARKS: See Handley (1980: 11) for use of the spelling Stenodermatinae instead of Stenoderminae. See Van Den Bussche et al. (1993) for discussion of relationships of the Stenodermatinae (treated by them as the tribe Stenodermatini).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Upper incisors and canine not bladelike [as in Desmodontinae]. Noseleaf almost always well-developed with a prominent upright portion. Tongue not [as in Glossophaginae] . . . exhibiting a transverse pattern in section, supplied by paired longitudinal arteries. Anterior upper premolar in contact with canine and almost always with posterior upper premolar. Zygomatic arch almost always complete. Upper molar cusp pattern greatly modified [i.e., widened and used in crushing food], no W-shaped ectoloph" (Koopman, 1994: 84). No external tail, although an internal tail in the form of caudal vertebrae extending posterior to the sacral vertebrae may be present.

Genus *Artibeus* Leach, 1821

The term "fruit-eating bat" has been used for members of the genus. Bolivian bats of other genera, especially other Stenodermatinae, also are frugivorous, however. The individual species of *Artibeus* have no truly vernacular names.

TAXONOMIC NOTES: One Bolivian skull was referred to as *Artibeus falcatus* by Gerrard (1862: 36), but I have no idea what it may be.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Dental formula i2/2, c1/1, p2/2, m2–3/2–3, total 28–32. "Rostrum one half to three quarters as long as braincase, not inflated, and without a deep depression [as in *Sphaeronycteris*] or long nasal emargination [as in *Chiroderma*]. Interpterygoid space not extended by a deep palatal emargination [see *Sphaeronycteris*, also deep in some other non-Bolivian genera]. Inner upper incisors not elongate, less than twice length of outer upper incisors, and usually bifid. Forehead usually markedly concave" (Koopman, 1994: 90).

In addition to the species of *Artibeus* treated below, another species is known from Peru (Balta in Loreto; Gardner, 1976: 10) and may possibly occur in Bolivia. This is *Artibeus* (*Koopmania*) *concolor* (Koopman *in* Wilson and Reeder, 1993: 188).

Artibeus anderseni Osgood, 1916

TAXONOMIC REMARKS: Sometimes placed in *Dermanura* as a subgenus or genus. The name used for Bolivian specimens has its type locality outside of Bolivia; *Artibeus an-*

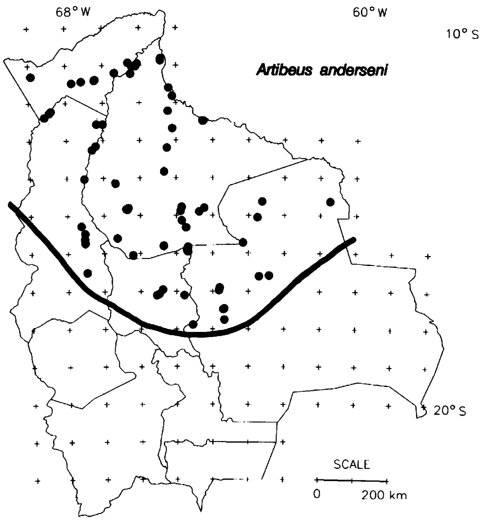


Fig. 557. Localities of known occurrence of *Artibeus anderseni.*

derseni was described by Osgood (1916: 212), type locality "Porto Velho, Brazil."

Morphological Characters and Comparisons: "Size relatively small (forearm length, 34–37 mm; greatest length of skull, 16–19 mm). Preorbital and postorbital processes absent. Last upper and lower molars absent [these would be the third molars if present]. Transition between braincase and rostrum abrupt. Upper molars relatively narrow. Uropatagium virtually hairless" (Koopman, 1994: 92). Measurements in tables 8 and 9 are of specimens from Independencia (AM 262556—262558, 262560–262564), Puerto Almacen (AM 255913–255915, 255917, 255908), and 6 km W of Casarabe (AM 255920, 255924–255925, 255929–255930).

Distributional Notes: Known localities are listed below and mapped in figure 557.

Habits: In a study during the first 6 hours of darkness at Espíritu, Beni (Aguirre, 1994: 89), the only specimen of this species was captured between the hours of 1800 and 2000.

No data for Bolivia are available on habitat, behavior, or food.

Reproduction: Three pregnant females (one embryo each) were recorded in July, September, and October.

Scientific synonyms used for Bolivian specimens are:

Artibeus anderseni: Sanborn, 1932: 179 (Buenavista). Webster and Jones, 1980: 4 (two from Tomonoco). Anderson et al., 1982: 8. Anderson and Webster, 1983: 3 (río Nareuda, Tumichucua). Webster and Fugler, 1984: 16 (Tumichucua, Tomonoco). Anderson, 1985b: 7 (name in list). Ibáñez, 1985: 330 (1658/6349). Hinojosa *in* Estenssoro, 1990 (collected in Chimane region). Hinojosa, 1992 (Serranía Eva Eva). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Anderson, 1993: 24 (general distributional records). Anderson et al., 1993: 25 (vicinity of Santa Cruz de la Sierra). Aguirre, 1994: 57 (isla de bosque El Chaco near Espiritu).

Artibeus cinereus anderseni: Hershkovitz, 1949: 449.

Dermanura anderseni: Wilson and Salazar, 1990: 51 (Estación Biológica del Beni). Owen, 1991: 22 (use of name).

Localities (68) and Specimens Examined or Reported (183): **Beni:** 1049/6525, Guayaramarin, 1 AM; 1052/6525, 5 km S of Guayaramarin, 9 AM; 1113/6614, Tumichucua, 8 LSU; 1136/6512, 6 km S of Buena Hora [Brazil], 10 AM, 1 IML; 1149/6506, 7 km N of Lagoinha, 4 AM; 1213/6513, east side of río Mamoré, opposite from Cascajal, 3 AM; 1229/6415, 4 km above Costa Marques, on río Iténez, 1 AM; 1229/6417, left bank of río Iténez, opposite Costa Marques [Brazil], 1 AM; 1241/6506, 17 km NNW of Nuevo Berlin, 2 AM; 1312/6515, 8 km N of Exaltación, 4 AM; 1350/6520, río Mamoré, 1 AM; 1410/6640, isla de bosque El Chaco near Espíritu, 1 (Aguirre, 1994: 66); 1446/6451, río Ibare, 24 km from mouth, 1 AM; 1447/6451, Puerto Almacen, 5 AM; 1448/6414, Casarabe, 1 AM; 1448/6619, Campamento El Trapiche, 2 AM, 2 CBF; 1450/6623, río Curireba, 1 US; 1451/6621, Totaisal, 2 CBF, 1 US; 1453/6453, 15 km SE of Puerto Julio, 1 AM; 1454/6422, 6 km W of Casarabe, 5 AM; 1508/6451, 10 km E of San Antonio, 2 AM; 1519/6444, Camiaco, 1 AM; 1536/6638, Serranía Eva Eva, 1 IE; 1550/6441, 5 km NW of mouth of río Grande, 1 AM; 1545/6523, Puerto San Lorenzo, prov. Moxos, 1 CBF; 1602/6610, Oromono, prov. Moxos, 1 CBF. **Cochabamba:** 1657/6523, 2 km E of Villa Tunari, 1 AM; 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional

Carrasco, 2 CBF, 1 MSB; 1706/6447, Sajta, 1 AM; 1706/6533, El Palmar, río Cochi Mayu, 2 AM, 1 CBF, 1 MSB. **La Paz:** 1234/6700, río Madidi, 8 km from mouth, 2 AM, 2 MSB; 1234/6710, Santa Ana de Madidi, 12 AM, 6 MSB; 1309/6712, río Beni, 1 AM; 1315/6718, río Beni, 2 AM, 3 MSB; 1401/6731, río Beni, 1 AM, 1 MSB; 1517/6737, 20 km by river N Puerto Linares, 5 LSU; 1529/6731, Tomonoco, 1 mi [= 1.6 km] W of Puerto Linares, 1 TTU, 1 (Webster and Jones, 1980); 1529/6731, 1 mi W of Puerto Linares, 1 MSU (perhaps one of the two reported by Webster and Jones); 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 4 LSU; 1544/6731, La Reserva, 840 m elevation, 1 MSB; 1630/6728, 2 km S of Irupana, 1 AM. **Pando:** 1056/6618, Remanso, 1 CBF; 1057/6603, left bank of río Beni, 3 AM, 1 MSB; 1101/6606, W bank río Beni, opposite Hamburgo, 4 AM, 1 MSB; 1101/6612, Agua Dulce, 5 AM, 1 MSB; 1112/6640, left bank río Madre de Dios, 2 AM, 4 MSB; 1117/6855, río Nareuda, 1 AM; 1123/6712, Bella Vista, 1 MSB; 1124/6713, La Cruz, 2 AM, 1 MSB; 1126/6734, Independencia, 8 AM; 1128/6750, 15 km NO de [= NW of] Puerto Camacho, 1 CBF; 1213/6824, Santa Rosa, 3 MSB; 1216/6827, 8 km SO de [= SW of] Santa Rosa, 1 CBF; 1223/6835, Isla Gargantua, 1 AM, 1 MSB. **Santa Cruz:** 1438/6044, 27.5 km S of Campamento Los Fierros, 1 MSB; 1438/6237, Perseverencia, 1 MNK; 1503/6245, río Negrillo, 2 MNK; 1543/6309, 6 km by road W of Ascención, 1 AM, MSB; 1555/6442, 5 km N of mouth of río Chapare, 1 AM; 1557/6441, 2 km N of mouth of río Chapare, 1 AM; 1636/6242, 10 km N of San Ramón, 1 AM; 1635/6225, 14 km by road NE of San Ramón, 1 AM; 1654/6348, La Ponderosa, Santa Rosa, 3 EBD; 1658/6349, 25 km NW of Santa Rosa de Sara (Ibáñez, 1985); 1727/6340, Buenavista, 1 CM (cat. no. 2734); 1728/6342, 4 km SW of Buena Vista, 1 MSB; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama,1 MSB; 1753/6433, El Tunal, 1 AM.

Artibeus glaucus Thomas, 1893

TAXONOMIC REMARKS: Sometimes placed in *Dermanura* as a subgenus or genus. Some names used for Bolivian specimens have type localities outside of Bolivia. *Artibeus glaucus* was described by Thomas (1893b: 336), type locality Chanchamayo, department of Junín, Peru. *Artibeus pumilio* was described by Thomas (1924a: 531), type locality Tushemo, near Masisea, in Loreto, Peru. Handley, 1987: 166 (regarded *pumilio* as "unplaceable"). Hershkovitz (1949b: 449) used the name combination *Artibeus cinereus pumilio*. *Artibeus gnomus* was described by Handley (1987: 167), type locality "El Manaco (= Km 74), 59 km SE El Dorado, Bolivar, Venezuala, 150 m".

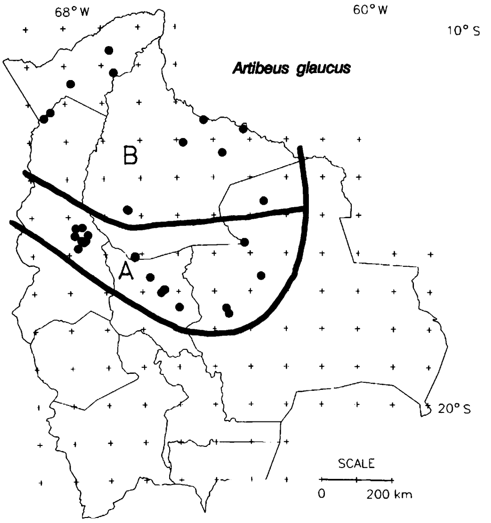


Fig. 558. Localities of known occurrence of two subspecies of *Artibeus glaucus*, *A. g. glaucus* (A) and *A. glaucus gnomus* (B).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 558.

No data for Bolivia are available on habitat, habits, behavior, or food.

REPRODUCTION: One female of *A. glaucus gnomus* taken in September had a single embryo.

Scientific synonyms used for Bolivian specimens are given under the subspecies below.

Artibeus glaucus glaucus
Thomas, 1893

Artibeus glaucus: Corbet and Hill, 1991: 66 (name in list).

Artibeus cinereus glaucus: Hershkovitz, 1949b:

449 (first use of name combination). Anderson et al., 1982: 8. Anderson and Webster, 1983: 3 (río Zongo). Webster and Fugler, 1984: 16 (Serranía Bella Vista, Tomonoco). Anderson, 1985b: 7 (name in list). Anderson et al., 1993: 25 (vicinity of Santa Cruz de la Sierra).

Artibeus cinereus pumilio: Webster and Jones, 1980: 4 (four specimens from Tomonoco, later reassigned to *A. c. glaucus*).

Artibeus cinereus: Barquez and Olrog, 1980: 54 (Yungas de Totora). Barquez, 1984a: 216 (Yungas de Totora). Vargas and Mendez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area).

Artibeus glaucus glaucus: Handley, 1987: 166, 171 (Buenavista; regarded *cinereus* as a separate species). Anderson, 1993: 24 (general distributional records).

Dermanura cinerea: Owen, 1991: 22 (use of name). Van Den Bussche, 1992: 42 (1 mi W of Puerto Linares).

LOCALITIES (20) AND SPECIMENS (85): **Beni:** 1602/6610, Oromono, 1 CBF. **Cochabamba:** 1637/6547, 50 km NW of Villa Tunari, 6 UMMZ; 1657/6523, 2 km E of Villa Tunari, 1 AM; 1657/6523, Balneario Las Pozas, Villa Tunari, 1 EBD; 1657/6524, 0.5 km NE of Villa Tunari, 2 UMMZ; 1702/6529, 3 km SW of Villa Tunari, 1 AM; 1725/6459, Yungas of Totora, río Yanimayo, 80 km N of Monte Punco, 5 (Barquez and Olrog, 1980; Barquez, 1984a reported 1; I have seen 2). **La Paz:** 1517/6737, 20 km by river N of Puerto Linares, 4 LSU; 1518/6748, 20 km by road NNE of Guanay, 1 UMMZ; 1529/6728, Tomonoco, 1 mi [= 1.6 km] W of Puerto Linares, 3 TTU, 1 (Webster and Jones, 1980); 1530/6750, 5 km by road SE of Guanay, 1 UMMZ; 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 25 LSU; 1538/6739, 6.6 km downstream from Caranavi, in valley of río Coroico 1 AM; 1540/6735, 35 km by road N of Caranavi, at Serranía Bellavista, 9 AM, 12 LSU, 1 MSU; 1550/6745, río Zongo, 1500 m elevation, 2 AM; coordinates unknown, perhaps La Paz, 2 AM. **Santa Cruz:** 1543/6309, 6 km by road W of Ascención, 1 AM; 1636/6242, 10 km N of San Ramón, 1 AM, 1 MSB; 1727/6340, Buenavista, 1 FM (21477, Handley, 1987: 171); 1736/6336, San Rafael de Amboró, 1 MSB.

Measurements in tables 8 and 9 are of specimens from 50 km NW of Villa Tunari (UM 126739–126742, 126838), 35 km N of Caranavi (AM 246628–246636), and 6.6 km downstream from Caranavi (AM 246627).

Artibeus glaucus gnomus Handley, 1987

Artibeus cinereus pumilio: Anderson et al., 1982: 8. Anderson, 1985: 7 (name in Bolivian list).

Artibeus cinereus: Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Sawada and Harada, 1986: 368 (Chivé).

Artibeus gnomus: Emmons and Smith, 1992 (Centro Dieciocho).

Dermanura cinereus: Wilson and Salazar, 1990: 51 (citing earlier report from Totaisal, near the Estación Biológica del Beni; use of the name).

Artibeus glaucus: Koopman *in* Wilson and Reeder, 1993: 188 (*glaucus*, *pumilio*, and *gnomus* regarded as conspecific).

Artibeus glaucus gnomus: Anderson, 1993: 24 (general distributional records).

LOCALITIES (13) AND SPECIMENS (15): **Beni:** 1229/6415, 4 km above Costa Marques [Brazil], on río Iténez, 1 AM; 1244/6310, Versalles, 1 AM; 1304/6449, San Joaquín, 1 FM; 1321/6345, El Mojon, 1 FM; 1450/6623, río Curireba, 2 US; 1451/6621, El Porvenir, 1 EBD; 1451/6621, Totaisal, 1 MNLP (not seen). **Pando:** 1036/6647, Centro Dieciocho, 1 CBF (Emmons and Smith, 1992); 1112/6640, left bank of río Madre de Dios, 1 AM; 1128/6750, 15 km NW of Puerto Camacho, 1 CBF; 1213/6824, Santa Rosa, 1 MSB; 1223/6835, Chivé, 2 (Sawada and Harada, 1986: 368, 369). **Santa Cruz:** 1438/6237, Perseverencia, 1 MNK.

Measurements in tables 8 and 9 are of specimens from Santa Ana de Madidi (AM 261689–261699) and 4 km above Costa Marques (AM 209584).

Artibeus hartii Thomas, 1892

TAXONOMIC REMARKS: Often placed in *Enchisthenes* Andersen, 1906, as a subgenus or separate genus. The name used for Bolivian specimens has its type locality outside of Bolivia. *Artibeus Hartii* was described by Thomas (1892: 409), type locality Botanical Gardens in [island of] Trinidad.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Inner upper incisors not bifid. Last upper and lower molars well developed. Size relatively small . . . (forearm length, 36–

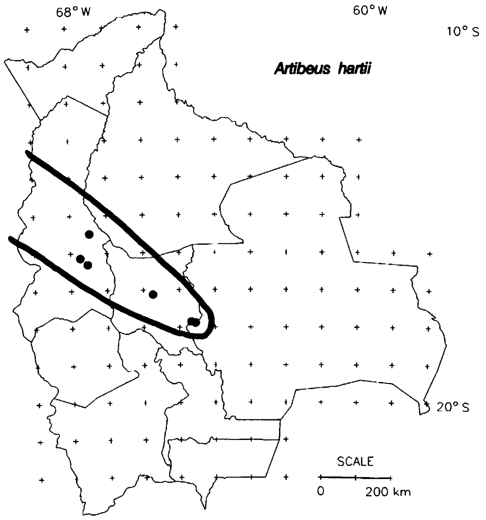


Fig. 559. Localities of known occurrence of *Artibeus hartii.*

41 mm; condylobasal length, 18–20 mm)" (Koopman, 1994: 90). Pelage dark, with forehead stripes, more or less cinnamon. Measurements in tables 8 and 9 are of the specimen from 1751/6440 (UM 155846), 1753/6433 (MNLP FH 181).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 559.

No data for Bolivia are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Enchisthenes hartii: Webster and Jones, 1980: 5 (one from Tomonoco). Webster and Fugler, 1984: 17 (Tomonoco). Eisenberg, 1989: 171 (mentioned "Amazonian Bolivia").

Artibeus hartii: Anderson et al., 1982: 8. Anderson, 1985b: 7 (name in list). Ibáñez, 1985: 330 (1707/6544). Anderson, 1993: 24 (general distributional records).

Dermanura hartii: Owen, 1991: 22 (use of name).

LOCALITIES (6) AND SPECIMENS (6): **Cochabamba:** 1707/6544, El Sillar, or Puerto del Sillar, 1 EBD; 1751/6440, 25 km by road W of Comarapa, in Siberia Cloud Forest, 1 UMMZ. **La Paz:** 1529/6728, Tomonoco, 1 mi [= 1.6 km] W of Puerto Linares, 1 TTU; 1608/6744, Chijchipa, 1 IE; 1618/6732, río Solocama, 14 km on road Chulumani to Irupana, 1 CBF. **Santa Cruz:** 1753/6433, El Tunal, cantón Comarapa, 1 MNLP.

Artibeus jamaicensis Leach, 1821

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. The type locality of *Artibeus jamaicensis* Leach (1821: 75) is the island of Jamaica. However, at one time or another, this name has been used for each of the three large species of *Artibeus* that occur in Bolivia, and further taxonomic revision might show that the name belongs with none of the three. In any event, the reader needs to be aware of the potential for confusion. If the genus is to be divided into subgenera, this species is in the subgenus *Artibeus*. *Artibeus fallax* was described by Peters (1865a: 355), type locality restricted to Cayena (= Cayenne, French Guiana) by Cabrera (1958: 89); however, Husson (1962: 175) designated a lectotype from "Suriname," which becomes the valid restricted type locality under the International Code of Zoological Nomenclature (Art. 74(a)iii; International Commission on Zoological Nomenclature, 1985). The name *Phyllostoma planirostre* Spix (1823: 66), type locality city of Baia, now Salvador, Brazil, was regarded as a synonym of *jamaicensis* by Handley (1990: 446). Whether *planirostris* and *fallax* are conspecific with each other and with *jamaicensis* and where subspecific boundaries should be drawn in South America remain to be clarified.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size relatively large (forearm length, 62–71 mm; greatest length of skull, 30–33 mm). Preorbital and postorbital processes poorly developed. Last upper molar present or absent, last lower normally present. Medial facial stripe variable, lateral poorly developed. Skull of medium width, rostrum not flattened" (Koopman, 1994: 90; at that time under the name *A. planirostris*). Measurements in tables 8 and 9 are of specimens from 6 km W of Casarabe (AM 255935–255944), Caranavi (MSU 28055–28068), and 1.5 km below Costa Marques (AM 209730–209733).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 560.

HABITAT: At least eight individuals were seen sleeping under the leaves of *Scheelea princeps*, a palm tree, at Espíritu Viejo (Aguirre, 1994: 99).

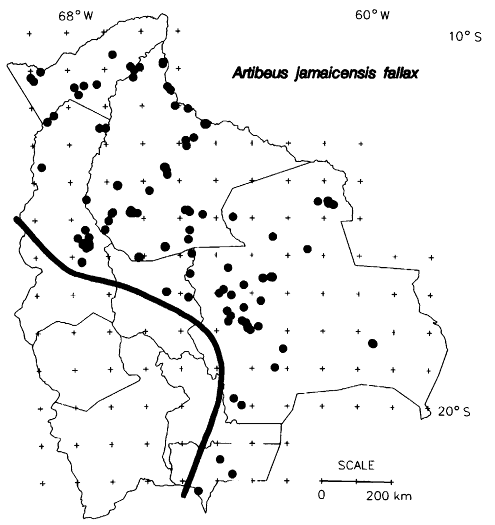


Fig. 560. Localities of known occurrence of *Artibeus jamaicensis fallax*.

Habits: In a study during the 12 hours of darkness at Espíritu, Beni (Aguirre, 1994: 89), individuals were netted at various times throughout the night.

No data for Bolivia are available on behavior or food.

Disease: The rabies virus was reported by Stouraitis and Salvatierra (1978) in one of three caught in a net set near a pig pen at Cajuata (1649/6715), at 2000 m elevation, in La Paz department. These bats were identified by Donald Patten. No voucher specimen was mentioned.

Reproduction: Pregnant females (9, each with one embryo) were recorded in July (1), August (4), September (3), and November (1). Nonpregnant females (34) recorded in January (1), May (7), June (6), July (12), August (6), and December (2).

Scientific synonyms pertaining to Bolivia are:

Artibeus jamaicensis fallax
Peters, 1865

Artibeus planirostris: Thomas, 1898b: 3 (Caiza). Stouraitis and Salvatierra, 1978: 101 (rabies virus, Cajuata). Webster and Jones, 1980: 5 (Caranavi and Tomonoco). Koepke and Kraft, 1984: 76 (on use of name). Hershkovitz, 1987b: 74 (Chiquitos Province, citing d'Orbigny and Gervais, 1847, who used the name *Stenoderma perspicillatum*; see also *Artibeus lituratus*). Sawada and Harada, 1986: 368 (El Naranjal and Hardeman). Barquez, 1988: 875 (Rurrenabaque). Koopman *in* Wilson and Reeder, 1993: 189 (use of name). Lim and Wilson, 1993: 763 ("tentatively" retained use of name).

Artibeus planirostris fallax: Anderson et al., 1982: 9. Anderson and Webster, 1983: 3 (río Nareuda, Cobija, Tumichucua). Webster and Fugler, 1984: 16 (Cobija, Tumichucua, Tomonoco, Caranavi, Rurrenabaque, Guayaramerin). Anderson, 1985b: 7 (name in list). *Artibeus jamaicensis*: Myers and Wetzel, 1983: 14 (in reference to specimens reported by Anderson et al., 1982, from Santiago). Ibáñez and Ochoa, 1989: 216 (38 km E La Florida). Wilson and Salazar, 1990: 51 (Estación Biológica del Beni). Handley, 1990: 446 (use of name). Emmons and Smith, 1992 (Centro Dieciocho). Emmons, 1991: 72 (Alto río Madidi). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Aguirre, 1994: 58 (three localities near Espíritu). Aguirre and Urioste, 1994: 72 (Espíritu).

Artibeus sp.: Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni; presumably referring to this species).

Artibeus jamaicensis fallax: Handley, 1987: 164 (on use of name); 1991: 12 (on use of name). Anderson, 1993: 24 (general distributional records). Anderson et al., 1993: 26 (vicinity of Santa Cruz de la Sierra).

Localities (123) and Specimens (720): **Beni:** 1049/6525, Guayaramarin, 1 AM, 28 (Webster and Fugler, 1984); 1052/6525, 5 km S of Guayaramarin, 1 AM; 1113/6614, Tumichucua, 2 LSU; 1129/6518, 5 km S of Coimbra [Brazil], 1 AM; 1134/6513, 5 km SW of Buena Hora [Brazil], 1 AM; 1200/6506, Puerto Moré, 12 AM; 1205/6445, between Bahia de Onças and Casa Alta, 1 AM; 1229/6415, 4 km above Costa Marques [Brazil], on río Iténez, 9 AM; 1229/6418, 1.5 km below Costa Marques, on río Iténez, 9 AM; 1230/6415, Pampa de Meio, 1 AM; 1230/6418, mouth of río Baures, 16 AM; 1251/6436, La Esperanza, 4 FM; 1255/6449, Caravani, 2 FM; 1304/6448, Camino Vilches, 1 FM; 1338/6523, [río Mamoré] on bank opposite from mouth of río Yacuma, 1 AM; 1338/6525, 2 km from mouth of río Yacuma, 3 AM; 1343/6521, Puerto Caballo, 1 AM; 1350/6520, río Mamoré, 1 AM; 1411/6638, isla de bosque Espíritu Viejo Espíritu, 12 (Aguirre, 1994: 66); 1413/6640, Espíritu, 5 at two nearby localities (Aguirre, 1994: 66); 1415/6550, Venecia, 1 EBD; 1428/6734, Rurrenabaque, 22 AM, 1 (Webster and Fugler, 1984) 2 MNLP, 1 IML; 1446/6621, Campamento La Pascana, 2 IE, 2 MNLP; 1447/6447, Trinidad, 2 MSU; 1447/6451, río Ibare, 26 km above mouth, 1 AM; 1448/6619, Campamento El Trapiche, 1 AM, 5 IE, 2 MNLP; 1449/6651, San Borja, 8 EBD; 1450/6444, 6 km by road SE of Trinidad, 3 AM; 1450/6623, 5 km N of Porvenir, Isla de Bosque, 7 MNLP; 1450/6622, Los Tajibos, 10 EBD (one not seen); 1451/6610, Estancia Glavir, 16 EBD (one not seen); 1451/6617, río Matos, 6 km E of Estación Biológica del Beni, 7 AM, 5 MSB; 1451/6621, Estación Biológica del Beni, 5 AM, 1 MSB; 1451/6621, El Porvenir, 4 EBD; 1451/6621, Estancia Porvenir, 1 MNLP, 1 US; 1451/6621, Florida, 2 EBD; 1451/6621, Totaisal, 1 km SW of Estación Biológica del Beni, 1 AM, 1 MNLP, 1 US; 1451/6621, Mato Totaisal, 1 EBD; 1451/6621, 50 km from San Borja on road to San Ignacio, 4 EBD; 1451/6653, 3 km by road SW of San Borja, 7 AM; 1454/6422, 6 km W of Casarabe, 9 AM; 1503/6658, 1 km E of La Embocada, at Estancia La Cabaña, 2 UMMZ; 1517/6704, Serranía de Pilón, 1 MSB; 1519/6444, Camiaco, 12 km NNW of Limoquije, 1 AM; 1534/6446, 15 km S of Limoquique, 1 AM; coordinates unknown, Laguna Bolivia, TIPNIS, 1 CBF; 1545/6523, San Lorenzo of río Sécure, TIPNIS, 2 CBF; 1602/6610, Oromomo, TIPNIS, 1 CBF. **Cochabamba:** 1657/6523, 2 km E of Villa Tunari, 3 AM; 1657/6524, San Antonio Mission, 1 AM; 1706/6447, Sajta, 1 CBF; coordinates unknown, Campamento II (Univ. Cochabamba), 2 MNK. **La Paz:** 1234/6700, río Madidi, 8 km from mouth, 2 AM, 1 MSB; 1234/6710, Santa Ana de Madidi, 4 AM; 1335/6846, Campamento Moira, Alto río Madidi (Emmons, 1991: 72), 1 IE; 1517/6737, 20 km by river N Puerto Linares, 17 LSU; 1517/6737, Pararia, 3 UMMZ; 1529/6731, Tomonoco, 1 mi [= 1.6 km] W of Puerto Linares, 12 TTU; 1529/6731, 1 mi W of Puerto Linares, 12 MSU (5 of these seen); 1530/6750, 5 km SE of Guanay, on río Challana, 1 UMMZ; 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 1 LSU; 1538/6739, 6.6 km downstream from Caranavi, in valley of río Coroico, 5 AM; 1540/6742, 4 km NW of Alcoche, 1 UMMZ; 1541/6731, 8 km NE of Caranavi, 1 AM; 1542/6735, 20 km NNE of Caranavi, 1 UMMZ; 1544/6731, La Reserva, 1 AM; 1546/6736, Caranavi, 14 MSU; 1608/6744, Chijchipa, 2 IE; 1609/6744, Chijchijpa, 1224 m, 2 AM, 2 CBF, 3 MSB. **Pando:** 1036/6647, Centro Dieciocho, 2 CBF (Emmons and Smith, 1992); 1057/6603, left bank of río Beni, 2 AM; 1056/6618, Remanso, 1 CBF; 1101/6612, Agua Dulce, 5 AM; 1102/6844, Cobija, 3 LSU; 1111/6900, El Naranjal, Nazaret, 13 (Sawada and Harada, 1986: 369); 1117/6855, río Nareuda, 17 AM; 1124/6713, La Cruz, 11 AM, 7 MSB; 1126/6734, right bank río Madre de Dios, opposite Independencia, 1 AM; 1126/6734, Independencia, 1 AM, 6 MSB; 1128/6750, 15 km NO de [= NW of] Puerto Camacho, 1 CBF; 1140/6743, San Miguel, 1 CBF; 1213/6824, Santa Rosa, 6 AM, 1 MSB; 1223/6835, Isla Gargantua, 6 AM, 5 MSB; 1223/6835, Chivé, 6 MNLP. **Santa Cruz:** 1432/6053, Los Fierros, 1 EBD, = 1436/6053, 38 km E of La Florida (Ibáñez and Ochoa, 1989: 216); 1432/6054, Parque Nacional "Noel Kempff Mercado," 1 AM, 1 MNK; 1433/6110, 4 km E of Aserradero Moira, 1 EBD; 1438/6044, 27.5 km S of Campamento Los Fierros, 5 AM; 1438/6045, 23 km S of Campamento Los Fierros, 2 MNK, 1 MSB; 1458/6332, Laguna Pajaral, 5 MNK; 1530/6225, Puerto Almacen, 14 MNK (4 not seen); 1550/6127, Santa Rosa de la Roca, 7 AM, 4 MNK, 2 MSB; 1557/6441, 2 km N of mouth of río Chapare, on río Mamoré, 3 AM; 1629/6444, 54 km S of mouth of río Chapare, on río Ichilo, 5 AM; 1634/6225, río Quiser on road from San Ramón to Concepción, 2 AM; 1634/6228, San Ramón, Castedo, 13 MNK; 1635/6225, 2 km N and 10 km E of San Ramón, 4 AM, 2 MNK, 1 MSB; 1636/6241, Finca La Laguna, 9 km N of San Ramón, 8 EBD; 1636/6242, 10 km N of San Ramón, 4 AM, 2 MSB; 1647/6314, Estancia Cachuela Esperanza, 4 AM, 1 MSB; 1654/6348, La Ponderosa, Santa Rosa, 1 EBD; 1700/6355, Ayacucho, 3 AM; 1703/6335, 7 km N of Santa Rosa, in province of Sara, 20 AM, 4 CM; 1712/6245, 1 km SE of Puerto Pacay, 1 MSB; 1723/6314, 3 km SE Montero, 1 km N of Villa Copacabana, 4 MNK; 1728/6342, 4 km SW of Buena Vista, 1 MSB; 1753/6307, Las

Lomitas, 15 km S of Santa Cruz, 1 MSB; 1736/6336, San Rafael de Amboro, 1 AM; 1744/6317, 8 km W of Santa Cruz, 1 Hayward coll., 9 MSB; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboro, río Pitasama, 4 AM, 1 MNK, 3 MSB; 1747/6310, Santa Cruz Zoo [grounds, not in a cage], 3 AM, 6 MNK, 29 MSB; 1748/6310, Santa Cruz [de la Sierra], 3 AM, one from owl pellet in La Paz; 1753/6249, Lomas de Arena, 8 MNK (2 not seen); 1755/6308, 15 km S of Santa Cruz, 3 MSB; 1758/6303, 27 km SE of Santa Cruz, 11 MSB; 1818/5936, 3 km by road S and 3 km by road W of Santiago de Chiquitos, 9 AM; 1819/5934, Santiago, 7 FM; 1828/6207, 8 km SE of Tita, 1 MSB; 1858/6221, San Antonio, Parapiti, 1 BM; 1948/6331, Cerro Itahuaticua, 810 m elevation, 12 AM, 11 MNK, 8 MSB; 1959/6318, 72 km ESE of Monteagudo, 5 FM; 1620/6340, Hardeman, 8 (Sawada and Harada, 1986:368). **Tarija:** 2126/6355, Tapecua, 1 CBF; 2149/6334, Caiza, 1 (Thomas, 1898b); 2216/6433, 3 km SE of Cuyambuyo, 1 AM.

Artibeus lituratus (Olfers), 1818

TAXONOMIC REMARKS: In the subgenus *Artibeus*, if subgenera are to be recognized. The name used for Bolivian specimens has its type locality outside of Bolivia; *Ph*[*yllostomus*]. *lituratus* was described by Olfers (*in* Eschwege, 1818: 224); the type locality was restricted to Asunción, Paraguay, by Cabrera (1958: 90).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size relatively large (forearm length, 66–75 mm; greatest length of skull, 30–33 mm). Preorbital and postorbital processes well developed. Last upper molar normally absent, but last lower normally present. Both medial and lateral facial stripes well developed [i.e. distinct and whitish]. Skull relatively broad with a flattened rostrum" (Koopman, 1994: 90). Measurements in tables 8 and 9 are of specimens from Caranavi (MSU 28070–28088), río Nareuda (AM 248905–248911), 1.5 km NW of Guayamarin (AM 210881), Guayaramarin (AM 209713–209716), and 5 km S of Guayaramarin (AM 209719—209721).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 561.

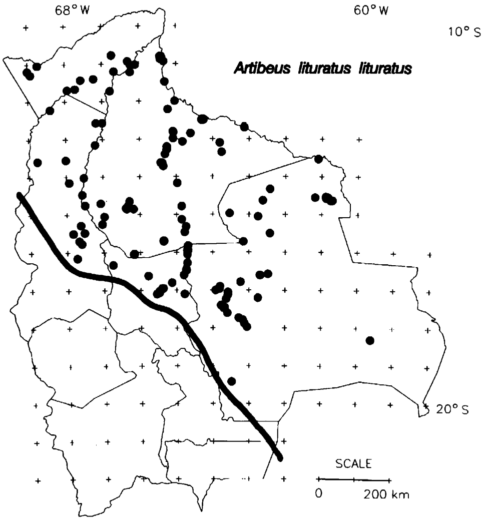


Fig. 561. Localities of known occurrence of *Artibeus lituratus lituratus.*

No data for Bolivia are available on habitat, habits, behavior, or food.

REPRODUCTION: Four females with one embryo were recorded in July (3) and August (1). Nonpregnant females (17) were recorded in May (2), June (4), July (5), August (4), and September (2).

Scientific synonyms used for Bolivian specimens are:

Artibeus lituratus lituratus (Olfers), 1818

Stenoderma perspicillatum: d'Orbigny and Gervais, 1847: 11 (specimens under this name reported from Guarayos and the province of Chiquitos in Santa Cruz may be referable to *A. lituratus* because the name *S. perspicillatum* was used formerly for specimens of large *Artibeus*, as noted by Pine, 1972: 9, and Anderson et al., 1982); examination of the original specimens would be needed to resolve this question).

Artibeus rusbyi Allen, 1904b: 230 (type locality "Yungas, Peru (alt. 6000 ft.)" but actually near latitude 18°S, in southeastern Cochabamba, Bolivia). Goodwin, 1953: 250 (type catalogue, unclear correction of original designation of Peru). Lawrence, 1993: 39 (type catalogue).

Artibeus jamaicensis lituratus: Sanborn, 1932: 178 (province of Sara).

Artibeus lituratus: Barquez, 1977 (specimens from 7 km N of Santa Rosa in Santa Cruz). Myers and Wetzel, 1983: 13 (7 km S of Santa

Rosa). Koepke and Kraft, 1984: 76 (on the differences between large species of *Artibeus*). Barquez, 1984a: 217 (7 km N of Santa Rosa). Ibáñez, 1985: 330 (1636/6241, 1658/6349). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Sawada and Harada, 1986: 368 (El Naranjal). Wilson and Salazar, 1990: 51 (in list for Estación Biológica del Beni). Emmons and Smith, 1992 (Centro Dieciocho). Vargas and Mendez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area).

Artibeus lituratus lituratus: Webster and Jones, 1980: 5 (Caranavi and Tomonoco). Anderson et al., 1982: 9. Anderson and Webster, 1983: 3 (río Nareuda, Cobija, Tumichucua). Webster and Fugler, 1984: 16 (Cobija, Tumichucua, Tomonoco, Caranavi, Rurrenabaque, Guayaramerin). Anderson, 1985b: 7 (name in list). Anderson, 1993: 24 (general distributional records). Anderson et al., 1993: 26 (vicinity of Santa Cruz de la Sierra). Lawrence, 1993: 39 (Yungas).

Artibeus literatus: Emmons, 1991: 72 (Alto río Madidi).

LOCALITIES (135) AND SPECIMENS (932): **Beni:** 1048/6526, 1.5 km NW Guayaramarin, 1 AM; 1049/6525, Guayaramarin, 4 AM, 92 (Webster and Fugler, 1984); 1052/6525, 5 km S of Guayaramarin, 3 AM; 1056/6520, 8 km N of Santa Cruz, 1 AM; 1113/6614, Tumichucua, 32 LSU; 1129/6518, 5 km S of Coimbra, 1 AM; 1144/6647, boca del río Biata, 2 AM, 3 MSB; 1200/6502, río Iténez, 20 km above mouth, 1 AM; 1213/6513, Cascajal, on opposite bank of río Mamoré, 1 AM; 1229/6415, 4 km above Costa Marques, on río Iténez, 8 AM; 1229/6417, left bank of río Iténez, opposite Costa Marques [Brazil], 40 AM, 1 IML; 1230/6415, Pampa de Meio, 7 AM; 1230/6418, mouth of río Baures, 20 AM; 1242/6308, Capivara, 30 km E of Versalles, 1 AM; 1248/6505, Puerto Siles, 2 AM; 1249/6504, 2 km SE of Puerto Siles, 3 AM; 1251/6436, La Esperanza, 1 FM; 1259/6505, 22 km S of Puerto Siles, 2 AM; 1304/6449, San Joaquín, 8 FM; 1306/6348, Buenavista, 4 FM; 1312/6515, 8 km N of Exaltación, 1 AM; 1317/6515, 2 km S of Exaltación, 1 AM; 1321/6345, El Mojon, 2 FM; 1324/6518, 4 km SE of Palacios, 1 AM; 1338/6523, mouth of río Yacuma, on opposite bank of río Mamoré, 8 AM; 1338/6525, río Yacuma, 2 km from mouth, 2 AM; 1343/6521, Puerto Caballo, 2 AM; 1410/6458, río Tijamuchi, 4 km from mouth, 1 AM; 1428/6734, Rurrenabaque, 5 AM, 1 (Webster and Fugler, 1984); 1439/6617, Campamento Busurucucú, 1 MNLP, 1 IE; 1442/6704, 45 km N of Yacuma, 1 AM, 1 MSB; 1446/6619, 2.5 km N of Trapiche, río Curiraba, 1 AM, 3 CBF; 1447/6451, Puerto Almacen, 3 AM; 1448/6619, Campamento El Trapiche, 1 AM, 1 IE, 2 MNLP; 1450/6622, Los Tajibos, 1 EBD; 1450/6623, río Curireba, 4 US; 1451/6610, Estancia Glavir, 9 EBD; 1451/6621, Estación Biológica del Beni, 1 AM; 1451/6621, El Porvenir, 1 EBD; 1451/6621, Florida, 5 EBD; 1503/6658, 1 km E of La Embocada, at Estancia La Cabaña, 4 UMMZ; 1508/6451, 10 km E of San Antonio, 1 AM; 1515/6702, Serranía Pilón, 27 km by road N of río Quiquibay, 4 AM; 1519/6444, Camiaco, 12 km NNW of Limoquije, 1 AM; 1528/6446, 5 km SE of Limoquije, 1 AM; 1550/6441, 5 km NW of mouth of río Grande, 7 AM; 1600/6608, 3 km NE of Oromomo, 1 CBF; 1602/6610, Oromomo, 2 CBF; coordinates unknown, río Sécure, TIPNIS, 2 CBF; 1545/6523, Puerto San Lorenzo, 2 CBF; coordinates unknown, Laguna Bolivia, 3 CBF. **Cochabamba:** 1557/6442, 2 km N of mouth of río Chapare, 1 AM; 1620/6645, Yungas, 1 AM; 1637/6547, 50 km NW of Villa Tunari, 11 UMMZ; 1648/6508, Chapare, 1 MNLP; 1657/6522, 4 km SE of Villa Tunari, 2 UMMZ; 1657/6523, 2 km E of Villa Tunari, 16 AM; 1657/6523, Balneario Las Pozas, Villa Tunari, 3 EBD; 1658/6524, 2 km SO de [= SW of] of Balneario Las Pozas, 2 EBD; 1657/6524, 0.5 km NE of Villa Tunari, 1 UMMZ; 1702/6529, 3 km SW of Villa Tunari, 3 AM; 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 1 AM, 1 MSB; 1706/6447, Sajta, 10 AM, 12 CBF, 10 MSB; 1706/6533, El Palmar, río Cochi Mayu, 1 MSB. **La Paz:** 1234/6700, río Madidi, 8 km from mouth, 2 AM; 1234/6710, Santa Ana de Madidi, 2 AM; 1309/6712, río Beni, 1 AM; 1333/6800, Ixiamas, 2 CBF; 1335/6846, Alto río Madidi (Emmons, 1991: 72); 1401/6731, río Beni, 2 MSB; 1409/6755, Tumupasa, 1 US; 1445/6730, río Quiquibey, 6 MNLP; 1517/6737, 20 km by river N Puerto Linares, 24 LSU; 1529/6731, 1 mi [= 1.6 km] N of Puerto Linares, 6 MSU, 9 TTU; 1529/6731, Tomonoco, 1 (Webster and Jones, 1980); 1530/6750, 5 km SE of Guanay, 1 UMMZ; 1542/

6740, Alcoche, 1 FM; 1546/6736, Caranavi, 92 MSU (not all examined), 4 TTU; 1609/6744, Chijchijpa, 1224m, 2 AMNH, 1 CBF, 1 MSB. **Pando:** 1046/6644, 18 km N of San Juan de Nuevo Mundo, 1 CBF; 1056/6618, Remanso, 1 AM, 1 CBF; 1101/6606, W bank río Beni, opposite Hamburgo, 1 AM, 1 MSB; 1102/6613, Puerto Candelaria, 2 MNLP; 1102/6844, Cobija, 1 LSU; 1111/6900, El Naranjal, Nazaret, 1 (Sawada and Harada, 1986:369); 1112/6640, left bank río Madre de Dios, 2 AM, 3 MSB; 1117/6855, río Narueda, 7 AM; 1124/6713, La Cruz, 2 AM, 4 MSB; 1126/6734, Independencia, 6 AM, 1 MSB; 1140/6743, San Miguel, 1 CBF; 1142/6756, Palmira, 1 AM; 1213/6824, Santa Rosa, 9 AM. **Santa Cruz:** 1332/6106, Parque Nacional "Noel Kempff Mercado," 2 MNK; 1420/6225, PRBN, 3 MNK; 1432/6053, Parque Nacional "Noel Kempff Mercado," 5 AM, 2 MNK; 1433/6049, 17 km S of Campamento Los Fierros, 8 AM; 1433/6053, Los Fierros, 2 EBD; 1433/6111, río Paragua, Aserradero Moira, 2 EBD; 1434/6053, 3 km S of Campamento Los Fierros, 2 AM, 4 MNK, 3 MSB; 1438/6042, Parque Nacional "Noel Kempff Mercado," 1 CBF; 1438/6044, 27.5 km S of Campamento Los Fierros, 7 AM, 4 MNK, 3 MSB; 1438/6044, Km 55, E of Aserradero Moira, 8 EBD; 1438/6045, 23 km S of Campamento Los Fierros, 3 AM, 3 MNK, 10 MSB; 1438/6237, Perseverencia, 5 MNK; 1458/6332, Pajaral, 1 MNK; 1503/6245, río Negrillo, 3 MNK; 1530/6225, Puerto Almacen, 12 MNK (2 not seen), 1 Venice; 1543/6309, 6 km by road W of Ascención, 1 MSB; 1557/6441, 2 km N of mouth of río Chapare, on right bank of río Mamoré, 2 AM; 1603/6442, 9 km S of mouth of río Chapare, on río Ichilo, 3 AM; 1617/6442, 34 km S of mouth of río Chapare, on río Ichilo, 1 AM; 1627/6444, 51 km S of mouth of río Chapare, on río Ichilo, 2 AM; 1628/6444, 52 km S of mouth of río Chapare, on río Ichilo, 9 AM; 1629/6444, 54 km S of mouth of río Chapare, on río Ichilo, 7 AM; 1634/6228, San Ramón, Castedo, 10 MNK; 1636/6241, La Laguna, 1 EBD; 1636/6242, 10 km N of San Ramón, 1 AM; 1636/6448, 70 km S of mouth of río Chapare, on río Ichilo, 2 AM; 1647/6314, Estancia Cachuela Esperanza, 3 AM, 1 MSB; 1654/6348, La Ponderosa, Santa Rosa, 5 EBD; 1658/6349, 25 km NW of Santa Rosa de Sara (Ibáñez, 1985); 1700/6355, Ayacucho, 3 AM, 1 MNK; 1703/6335, 7 km N of Santa Rosa, in province of Sara, 17 AM, 5 CM, 4 IML, 38 (Ojeda and Barquez, 1978), 11 in Tucumán (Barquez, 1984a); 1712/6245, 1 km SE of Puerto Pacay, 1 MSB; 1707/6335, province of Sara, 7 CM; 1714/6338, 4.5 km N of Buen Retiro, 1 MSB; 1724/6346, río Yapacaní, 1 FM; 1727/6340, Buenavista, 2 BM, 16 MACN (not examined); 1728/6342, 4 km SW of Buena Vista, 2 MSB; 1736/6336, San Rafael de Amboró, 4 AM, 3 MSB; 1744/6317, 8 km W of Santa Cruz, 2 MSB; 1747/6310, Santa Cruz Zoo, 1 Hayward coll.; 1753/6307, Las Lomitas, 15 km S of Santa Cruz, 1 AM; 1758/6303, 27 km SE of Santa Cruz, 1 Hayward coll., 2 MSB; 1818/5936, 3 km by road S and 3 km by road W of Santiago de Chiquitos, 1 AM; 1925/6329, 10 km E of Gutierrez, in province of Sara, 17 AM, 5 CM, 38 (Ojeda and Barquez, 1978).

Artibeus obscurus
(Schinz *in* G. Cuvier), 1821

TAXONOMIC REMARKS: In the subgenus *Artibeus*, if subgenera are to be recognized. Some names used for Bolivian specimens have type localities outside of Bolivia. *Phyllostoma obscurum* was described by Schinz (1821: 164), type locality Brasil. *Artibeus fuliginosus* was described by Gray (1838: 487); type locality "South America."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: The smallest of the three large species of *Artibeus* in Bolivia. "Size fairly large (forearm length, 52–68 mm; greatest length of skull, 26–32 mm). Preorbital and postorbital processes poorly developed [or not evident at all]. Last [i.e., third] upper molar present or absent, last lower [i.e., third] normally present .... Skull of medium width, rostrum not flattened" (Koopman, 1994: 90; at that time under the name *A. jamaicensis*). Pelage blackish. Facial marks obscure. Measurements in tables 8 and 9 are of specimens from 50 km N of Yacuma (AM 261085–261090), río Nareuda (AM 248895–248904), 6.6 km downstream from Caranavi (AM 246641–246644), and río Madidi (AM 261708–261709).

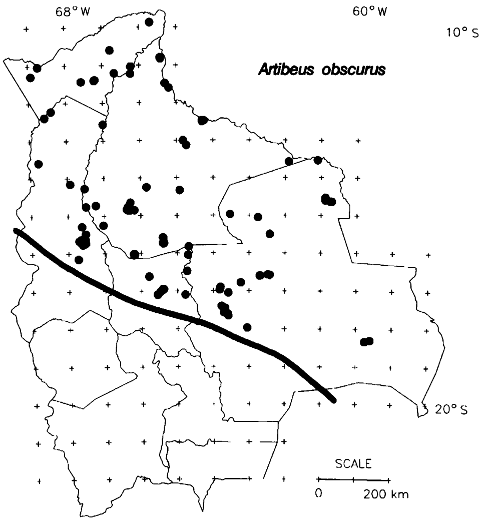


Fig. 562. Localities of known occurrence of *Artibeus obscurus*.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 562.

No data for Bolivia are available on habitat, habits, behavior, or food.

REPRODUCTION: Two pregnant females (one embryo each) were recorded in May and July. Six nonpregnant females were recorded in March (1), April (1), June (2), July (1), and December (1).

Scientific synonyms relevant to Bolivian specimens are:

Artibeus fuliginosus: Webster and Jones, 1980: 5 (Caranavi and Tomonoco). Koepke and Kraft, 1984: 76 (on use of name). Handley, 1987: 164 (on use of name).

Artibeus perspicillatus: Dobson, 1878: 519 (may have referred, at least in part, to Bolivian specimens of this taxon, as did Alston, 1879: 47).

Artibeus jamaicensis: Barquez, 1977. Ojeda and Barquez, 1978: 37 (specimens from 7 km N of Santa Rosa). Barquez, 1984a: 216 (7 km N of Santa Rosa). Ibáñez, 1985: 330 (1636/6241, 1658/6349). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Ibáñez and Ochoa, 1989: 216 (38 km E of La Florida).

Artibeus jamaicensis fuliginosus: Anderson et al., 1982: 8. Anderson and Webster, 1983: 3 (río Nareuda, Cobija, Tumichucua). Webster and Fugler, 1984: 16 (Tumichucua, Cobija, Caranavi, Tomonoco). Anderson, 1985b: 7 (name in list).

Artibeus obscurus: Wilson and Salazar, 1990: 51 (Estacion Biologica del Beni). Handley, 1990: 448 (use of the name). Emmons and Smith, 1992 (0952/6542, 1036/6647). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Anderson, 1993: 24 (general distributional records). Anderson et al., 1993: 26 (vicinity of Santa Cruz de la Sierra).

Artibeus obscura: Emmons, 1991: 72 (Alto río Madidi).

LOCALITIES (133) AND SPECIMENS (381): **Beni:** 1048/6526, 1 mi [= 1.6 km] NW of Guayaramarin, 1 AM; 1049/6525, Guayaramarin, 6 AM, 1 IML; 1113/6614, Tumichucua, 1 LSU; 1129/6518, 5 km S of Coimbra [Brazil], 1 AM; 1136/6512, 6 km S of Buena Hora [Brazil], at Arroyo Mercedes, 1 AM; 1229/6415, 4 km above Costa Marques, on río Iténez, 5 AM; 1229/6417, left bank of río Iténez, opposite Costa Marques [Brazil], 4 AM; 1229/6418, 1.5 km below Costa Marques, on río Iténez, 3 AM; 1230/6418, mouth of río Baures, 2 AM; 1300/6449, Aguadulce, 1 FM; 1308/6444, Altwa San Juan, 4 km S of San Juan, 1 FM; 1334/6154, Remansos, 1 km below mouth of río Paragua, 1 AM; 1415/6550, Venecia, 1 EBD; 1420/6455, 10 km W of San Pedro, 1 AM; 1439/6617, Campamento Busurucucú, 1 AM, 1 CBF; 1443/6714, 50 km N of Yacumo, on road to Rurrenabaque, 6 AM; 1446/6621, Campamento La Pascana, 1 CBF; 1448/6618, 2 km E of El Trapiche, 1 CBF; 1448/6619, Campamento El Trapiche, 3 CBF; 1450/6623, Beni Reserve, río Curiaba, 1 IE, 1 MNLP, 4 US; 1451/6610, Estancia Glavir, 1 EBD; 1451/6617, río Matos, 6 km E of Estación Biológica del Beni, 1 AM, 2 MSB; 1451/6621, Estación Biológica del Beni, 1 AM, 1 MSB; 1451/6621, Totaisal, 1 km SW of Estación Biológica del Beni, 1 AM, 1 CBF, 1 EBD, 1 US; 1515/6702, Serranía Pilón, 27 km by road N of río Quiquibay, 5 AM; 1550/6441, 5 km NW of mouth of río Grande, 1 AM; coordinates unknown, Arruda, 1 FM; coordinates unknown, probably EBB, 2 CBF; 1536/6523, 15 km NE of Puerto San Lorenzo, 2 CBF; 1545/6523, Puerto San Lorenzo, TIPNIS, of río Sécure, 1 CBF; 1543/6523, 3 km N of Puerto San Lorenzo, 1 CBF; coordinates unknown, 3 km NE of río Secure, TIPNIS, 1 CBF; 1602/6610, Oromomo, 1 CBF. **Cochabamba:** 1637/6547, 50 km

NW of Villa Tunari, 1 UMMZ; 1657/6523, 2 km E of Villa Tunari, 8 AM; 1657/6524, San Antonio Mission, on río Chimoré, 1 AM; 1657/6523, Balneario Las Pozas, Villa Tunari, 4 EBD; 1658/6524, 2 km SO de [= SW of] Balneario Las Pozas, 9 EBD; 1702/6529, 3 km SW of Villa Tunari, 2 AM; 1706/6447, Sajta, 7 AM, 6 CBF, 6 MSB; 1706/6533, El Palmar, río Cochi Mayu, 1 AM. **La Paz:** 1234/6700, río Madidi, 8 km from mouth, 2 AM; 1335/6846, Alto río Madidi (Emmons, 1991: 72); 1409/6755, Tumupasa, 1 US; 1416/6732, río Beni, 2 AM, 1 MSB; 1445/6730, río Quiquibey, 5 MNLP; 1517/6737, Sararia, 2 UMMZ; 1517/6737, 20 km by river N of Puerto Linares, 23 LSU; Tomonoco, 1 (Webster and Jones, 1980, reported 19 from here and Caranavi together), 20 (Webster and Fugler, 1984); 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 9 MSU, 10 TTU (probably among those reported by Webster and Jones, 1980, from Tomonoco); 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 12 LSU; 1538/6739, 6.6 km downstream from Caranavi, in valley of río Coroico, 4 AM; 1540/6742, 4 km NW of Alcoche, 1 UMMZ; 1542/6735, 20 km NNE of Caranavi, 2 UMMZ; 1542/6740, Alcoche, 6 FM; 1544/6731, La Reserva, 4 AM, 1 CBF, 1 MSB; 1546/6736, Caranavi, 3 AM, 1 MSU (Webster and Jones, 1980); 1609/6744, Chijchijpa, 1224 m, 1 AMNH, 1 MSB. **Pando:** 0952/6542, main camp on río Negro, 1 CBF, 1 US (Emmons and Smith, 1992); 1036/6647, Centro Dieciocho (Emmons and Smith, 1992); 1102/6613, Puerto Candelaria, 1 MNLP; 1102/6844, Cobija, 1 LSU; 1112/6640, left bank río Madre de Dios, 1 AM, 1 MSB; 1117/6855, río Nareuda, 10 AM; 1123/6712, Bella Vista, 1 AM; 1124/6713, La Cruz, 1 AM; 1126/6734, Independencia, 1 AM; 1213/6824, Santa Rosa, 1 MSB; 1223/6835, Isla Gargantua, 6 AM, 3 MSB; 1223/6835, Chivé, 7 MNLP. **Santa Cruz:** coordinates unknown, campamento Mangaulito, 4 MNK; coordinates unknown, Parque Nacional "Noel Kempff Mercado," 1 MNK; 1432/6053, Los Fierros, 6 EBD; 1434/6053, 3 km S of Campamento Los Fierros, 1 AM, 2 MSB; 1436/6053, 38 km E of La Florida (Ibáñez and Ochoa, 1989); 1438/6042, Encanto, 1 CBF; 1438/6044, 27.5 km S of Campamento Los Fierros, 1 AM, 2 MNK; 1438/6044, 55 km E of Aserradero Moira, 1 EBD; 1458/6332, Laguna Pajaral, 3 MNK; 1503/6245, río Negrillo, 8 MNK; 1530/6225, Puerto Almacen, 1 MNK; 1603/6442, 9 km S of mouth of río Chapare, on río Ichilo, 2 AM; 1629/6444, 54 km S of mouth of río Chapare, on río Ichilo, 3 AM; 1634/6228, San Ramón, Castedo, 4 MNK; 1635/6225, 2 km N and 10 km E of San Ramón, 1 AM; 1636/6241, La Laguna, 10 km N of San Ramón (Ibáñez, 1985); 1636/6242, 10 km N of San Ramón, 1 AM; 1647/6314, Estancia Cachuela Esperanza, 3 AM; 1654/6348, La Ponderosa, Santa Rosa, 2 EBD; 1658/6349, 25 km NW of Santa Rosa de Sara (Ibáñez, 1985); 1703/6335, 7 km N of Santa Rosa, in province of Sara, 5 AM, 39 (Ojeda and Barquez, 1978), 6 in Tucumán (Barquez, 1984); 1724/6346, 25 km by road W of Buena Vista on W bank of río Yapacaní, 1 UMMZ; 1727/6340, Buenavista, province of Sara, 1 CM; 1736/6336, San Rafael de Amboró, 1 MSB; 1734/6342, 3 km N and 13.5 km W of San Rafael de Amboró, río Saguayo, 2 AM, 2 MSB; 1739/6335, 4.5 km S and 2 km E of San Rafael de Amboró, 5 AM; 1758/6303, 27 km by road SE of Santa Cruz, 1 MSB; 1818/5936, 3 km by road S and 3 km by road W of Santiago de Chiquitos, 1 AM; 1820/5945, Roboré, 2 AM.

Genus *Chiroderma* Peters, 1860b: 747

The term "large-eyed bat" has been used for members of the genus. Dental formula i2/2, c1/1, p2/2, m2/2, total 28. "Rostrum approximately two thirds as long as braincase, not inflated, and without a deep depression, but with a long nasal emargination. Interpterygoid space not extended by a deep palatal emargination. Inner upper incisors elongate, more than twice length of outer upper incisors, and more or less pointed" (Koopman, 1994: 88). Three of the five living species of the genus occur in Bolivia.

Chiroderma salvini Dobson, 1878

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Chiroderma salvini* was described by Dobson (1878: 532), type locality

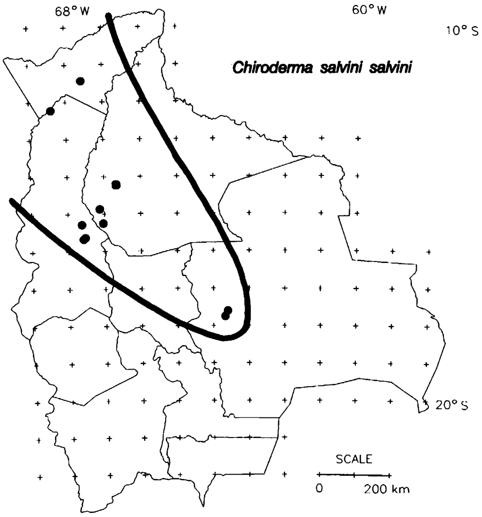


Fig. 563. Localities of known occurrence of *Chiroderma salvini salvini.*

Costa Rica. Handley (1966a: 297) first used the name *Chiroderma salvini salvini.*

Morphological Characters and Comparisons: "Size medium (forearm length, 43–52; condylobasal length, 21–25 mm). Anterior lower premolar relatively small with anterior cusp poorly developed. Inner upper incisors strongly converging with tips in contact. Dorsal and facial stripes prominent" (Koopman, 1994: 89). Measurements in tables 8 and 9 are of specimens from San Rafael de Amboró (AM 261667–261670), 4.5 km N and 1.5 km E of Cerro Amboró (AM 261666), Serranía Pilón (AM 261077), 35 km N of Caranavi (AM 246625), 47 km N of Caranavi (LSU 22716), Santa Rosa (AM 262537), and 20 km N of Puerto Linares (LSU 23313).

Distributional Notes: Known localities are listed below and mapped in figure 563.

Habitat: The only specimen taken in a study of the bat communities at Espíritu in Beni by Aguirre (1994: 57) was captured in a net beneath a fig tree (*Ficus guaranitica*). One was seen also under a leaf of *Scheelea princeps*, a palm, at Espíritu Viejo (Aguirre, 1994: 99).

Habits and Behavior: In a study during the first 6 hours of darkness at Espíritu, Beni (Aguirre, 1994: 89), the only specimen taken was netted between the hours of 2000 and 2200.

No Bolivian data are available on food or reproduction.

Scientific synonyms used for Bolivian specimens are:

Chiroderma salvini salvini
Dobson, 1878

Chiroderma salvini salvini: Anderson et al., 1982: 8. Anderson, 1985b: 7 (name in list). Anderson, 1993: 24 (general distributional records). Anderson et al., 1993: 25 (vicinity of Santa Cruz de la Sierra).

Chiroderma salvini: Aguirre, 1994: 57 (Espíritu).

Localities (10) and Specimens (16): **Beni:** 1413/6640, Espíritu, 1 (Aguirre, 1994: 57); 1452/6707, Km 35, NW of Yucumo, 1 CBF; 1515/6702, Serranía Pilón, 27 km by road N of río Quiquibay, 1 AM. **La Paz:** 1517/6737, 20 km by river N Puerto Linares, 1 LSU; 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 1 LSU; 1540/6735, 35 km by road N of Caranavi, at Serranía Bellavista, 1 AM. **Pando:** 1126/6734, Independencia, 1 MSB; 1213/6824, Santa Rosa, 2 AM. **Santa Cruz:** 1736/6336, San Rafael de Amboró, 4 AM, 2 MSB; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 1 AM.

Chiroderma trinitatum
Goodwin, 1958

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Chiroderma trinitatum* was described by Goodwin (1958: 1), type locality Cumaca, Trinidad. Handley (1960: 464) used the name *Chiroderma trinitatum trinitatum.*

Morphological Characters and Comparisons: "Size relatively small (forearm length, 37–42; condylobasal length, 19–20 mm). Anterior lower premolar relatively large with anterior cusp well developed. Inner upper incisors bluntly pointed, in contact except at tips. Dorsal and facial stripes prominent" (Koopman, 1994: 89). Measurements in tables 8 and 9 are of specimens from 10 km N of San Ramón (AM 261675), 1 mi W of Puerto Linares (MSU 32958–32960), 20 km N of Puerto Linares (LSU 23369, 23376,

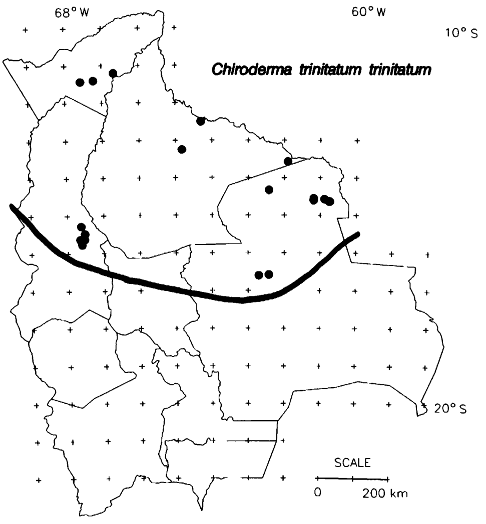


Fig. 564. Localities of known occurrence of *Chiroderma trinitatum trinitatum.*

23379, 23381, 23389, 23403), and 47 km N of Caranavi (LSU 22856).

Distributional Notes: Known localities are listed below and mapped in figure 564.

No Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: Three females, each with one embryo, were taken in July (2) and August (1).

Scientific synonyms used for Bolivian specimens are:

Chiroderma trinitatum trinitatum Goodwin, 1958

Chiroderma trinitatum trinitatum: Webster and Jones, 1980: 4 (five from Tomonoco). Anderson, 1985b: 7 (name in list). Anderson, 1993: 24 (general distributional records).

Chiroderma trinitatum: Koopman, 1976: 46 (four specimens). Anderson et al., 1982: 8. Ibáñez and Ochoa, 1989: 219 ("near" La Florida).

Chiroderma trinitatus trinitatus: Webster and Fugler, 1984: 16 (Tomonoco, Caranavi).

Localities (20) and Specimens (61): **Beni:** 1230/6418, mouth of río Baures, 1 AM; 1315/6449, 20 km S of San Joaquín, 1 AM; 1334/6154, Remansos, 2 AM. **La Paz:** 1517/6737, 20 km by river N Puerto Linares, 12 LSU; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 3 MSU, 2 TTU; 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 2 LSU, 1 (Webster and Fugler, 1984, as Caranavi); 1538/6739, 6.6 km downstream from Caranavi, in valley of río Coroico, 1 AM; 1546/6736, Caranavi, 1 MSU. **Pando:** 1112/6640, left bank río Madre de Dios, 1 MSB; 1124/6713, Le Cruz, 1 MSB; 1126/6734, Independencia, 3 AM, 1 MSB. **Santa Cruz:** 1420/6225, PRBN, 1 MNK; 1433/6111, río Paragua, Aserradero Moira, 1 EBD; 1434/6053, 3 km S of Campamento Los Fierros, 1 AM; 1438/6044, 55 km E of Aserradero Moira, 1 EBD, = 1436/6111, "near" La Florida, 1 (Ibáñez and Ochoa, 1989); 1438/6045, 23 km S of Campamento Los Fierros, 1 AM, 3 MNK; 1438/6044, 27.5 km S of Campamento Los Fierros, 5 AM, 3 MSB; 1635/6225, San Ramón, Castedo, 1 MNK, 1 MNK; 1636/6242, 10 km N of San Ramón, 2 AM.

Chiroderma villosum Peters, 1860

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Chiroderma villosum* was described by Peters (1860b 748); type locality is Brazil, according to Carter and Dolan (1978: 59), rather than Venezuela as cited by Cabrera (1958: 85). Handley (1960: 466) first used the name combination *Chiroderma villosum villosum.*

Morphological Characters and Comparisons: "Size medium (forearm length, 42–51; condylobasal length, 22–24 mm). Anterior lower premolar relatively small with anterior cusp poorly developed. Inner upper incisors sharply pointed, not in contact, and parallel to one another. Dorsal and facial stripes poorly developed" (Koopman, 1994: 89). Measurements in tables 8 and 9 are of specimens from Independencia (AM 262527–262533, MSB 57044) and opposite Costa Marques (AM 209529–209540, 209549–209551).

Distributional Notes: Known localities are listed below and mapped in figure 565.

No Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: Seven females (each with one embryo) were taken in August (5) and September (2).

Scientific synonyms used for Bolivian specimens are:

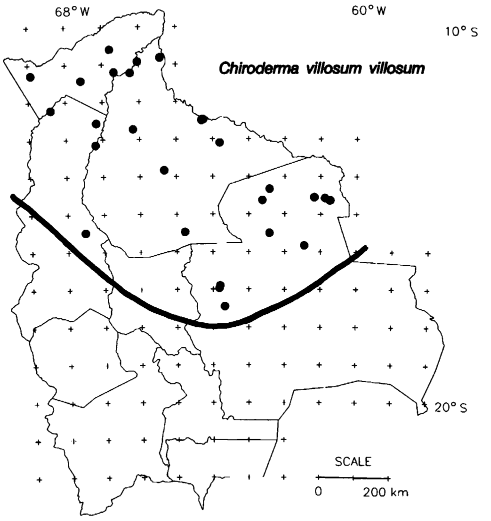


Fig. 565. Localities of known occurrence of *Chiroderma villosum villosum.*

Chiroderma villosum villosum Peters, 1860

Chiroderma villosum villosum: Koopman, 1976: 46 (numerous specimens). Anderson et al., 1982: 8. Anderson and Webster, 1983: 3 (río Nareuda). Webster and Fugler, 1984: 16 (Tumi Chucua, Tomonoco). Anderson, 1985b: 7 (name in list). Anderson, 1993: 24 (general distributional records). Anderson et al., 1993: 25 (vicinity of Santa Cruz de la Sierra).

Chiroderma villosum: Ibáñez, 1985: 330 (1658/6349). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Wilson and Salazar, 1990: 51 (in list for Estación Biológica del Beni). Emmons and Smith, 1992 (Centro Dieciocho).

LOCALITIES (32) AND SPECIMENS (105): **Beni:** 1049/6525, 5 km S of Guayaramarin, 9 AM; 1055/6602, 10 km NNE of Riberalta, 2 US; 1113/6614, Tumichucua, 4 (Webster and Fugler, 1984); 1229/6415, 4 km above Costa Marques, on río Iténez, 4 AM; 1229/6417, left bank of río Iténez, opposite Costa Marques [Brazil], 31 AM, 1 IML; 1230/6418, mouth of río Baures, 7 AM; 1244/6610, Versalles, 1 AM; 1306/6348, Buenavista, 1 FM; 1350/6520, río Mamoré, 1 AMHH; 1528/6446, Limoquije, 5 km SE of, 1 AM. **La Paz:** 1234/6710, Santa Ana de Madidi, 3 AM; 1309/6712, río Beni, 1 AM; 1529/6731, 1 mi [= 1.6 km] W Puerto Linares, 3 MSU, 4 TTU. **Pando:** 1036/6647, Centro Dieciocho, 2 CBF, 1 US (Emmons and Smith, 1992); 1112/6640, left bank río Madre de Dios, 2 MSB; 1117/6855, río Nareuda, 2 AM; 1126/6734, Independencia, 7 AM, 1 MSB; 1126/6734, right bank río Madre de Dios, opposite Independencia, 3 AM; 1213/6824, Santa Rosa, 1 AM; coordinates unknown, 1 AM. **Santa Cruz:** 1420/6225, PRNB, 1 MNK; 1433/6110, 4 km E of Aserradero Moira, 1 EBD; 1433/6111, río Paragua, Aserradero Moira, 1 EBD; 1434/6053, 3 km S of Campamento Los Fierros, 1 MSB; 1438/6044, 27.5 km S of Campamento Los Fierros, 1 AM; 1438/6045, 23 km S of Campamento Los Fierros, 1 AM, 1 MNK; 1438/6237, Perseverencia, 1 MNK; 1530/6225, Puerto Almacen, 1 MNK; 1550/6127, Santa Rosa de la Roca, 1 MNK; 1654/6348, La Ponderosa, 1 EBD; 1658/6349, 25 km NW of Santa Rosa de Sara (Ibáñez, 1985); 1727/6340, Buenavista, 1 AM.

Genus *Mesophylla* Thomas, 1901

Dental formula i2/2, c1/1, p2/2, m2/3, total 30. "Rostrum approximately three quarters as long as braincase, not inflated and without a deep depression or long nasal emargination. Interpterygoid space not extended by a deep palatal emargination. Inner upper incisors elongate, usually more than twice length of outer upper incisors, not deeply bifid. Anterior lower molar without a postero-internal cusp. Lingual cusps of middle lower molar vestigial or absent. Leaflet behind noseleaf present. Ear pinna with small round basal lappet. Posterior upper molar without a median ridge. Middle lower molar scarcely wider than horizontal ramus of mandible, with low cusps and no median ridge" (Koopman, 1994: 89).

Mesophylla macconnelli Thomas, 1901

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Mesophylla Macconnelli* was described by Thomas (1901d: 143), type locality "Kunuku Mountains, British Guiana."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size fairly small (forearm length, 29–34; condylobasal length, 15–17 mm).

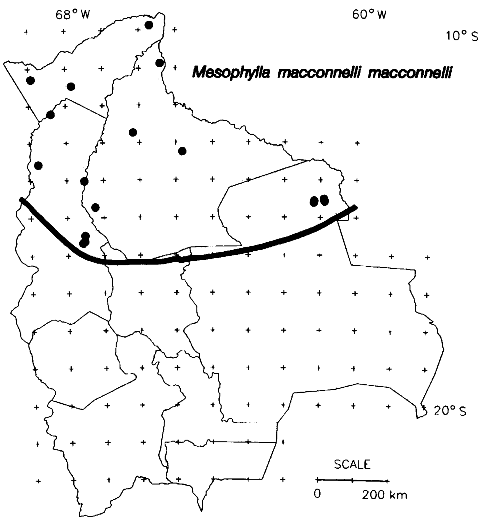


Fig. 566. Localities of known occurrence of *Mesophylla macconnelli macconnelli.*

Color light brownish" (Koopman, 1994: 90). Measurements in tables 8 and 9 are of specimens from Puerto Linares (MSU 32961–32964), 47 km N of Caranavi (LSU 22858), 35 km N of Caranavi (AM 246626), río Nareuda (AM 248886–248887), and Santa Rosa (AM 262540—262541, MSB 57047).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 566.

No Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Four females in July were recorded as having no embryos; no other data available.

Scientific synonyms used for Bolivian specimens are:

Mesophylla macconnelli macconnelli Thomas, 1901

Ectophylla macconelli: Laurie, 1955: 269 (first use of this name combination). Koopman, 1976: 46 (6 Bolivian specimens).

Ectophylla macconelli macconelli: Anderson et al., 1982: 8. Anderson and Webster, 1983: 3 (río Nareuda).

Mesophylla macconelli macconelli: Webster and Jones, 1980: 4. Webster and Fugler, 1984: 17 (Tomonoco). Anderson, 1993: 24 (general distributional records).

Ectophylla macconnelli macconnelli: Koopman, 1978: 12 (use of name in form *E. m. macconnelli*). Anderson, 1985b: 7 (name in list).

Mesophylla macconelli: Ibáñez and Ochoa, 1989: 219 ("near" La Florida). Emmons and Feer, 1990: 74 (mentioned Bolivia). Van Den Bussche, 1992: 42 (1 mi W of Puerto Linares).

Mesophylla macconnelli: Emmons and Smith, 1992 (0952/6542). Emmons, 1991: 72 (Alto río Madidi).

Mesophylla macconnelli macconnelli: Kunz and Pena, 1992: 1 (summary of species).

LOCALITIES (17) AND SPECIMENS (34): **Beni:** 1052/6525, 5 km S of Guayaramarin, 4 AM; 1244/6610, Versalles, 1 AM; 1315/6449, Yutiole, 1 AM; 1443/6714, 50 km N of Yacumo, on road to Rurrenabaque, 1 AM. **La Paz:** 1335/6846, Moira Camp, Alto río Madidi, 1 CBF; 1401/6731, río Beni, 2 AM, 1 MSB; 1529/6731, Tomonoco, 1 mi [= 1.6 km] W of Puerto Linares, 4 MSU, 4 TTU; 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 1 LSU; 1540/6735, 35 km by road N of Caranavi, at Serranía Bellavista, 1 AM. **Pando:** 0952/6542, Main camp on río Negro, 1 CBF (Emmons and Smith, 1992); 1117/6855, río Nareuda, 2 AM; 1128/6750, 15 km NO de [= NW of] Puerto Camacho, 1 CBF; 1213/6824, Santa Rosa, 2 AM, 1 MSB. **Santa Cruz:** 1430/6054, Campamento Precámbrico, = 3.5 km N of Los Fierros or 1436/6111, "near" La Florida (Ibáñez and Ochoa, 1989); 1434/6053, 3 km S of Campamento Los Fierros, 1 MNK; 1433/6110, 4 km E of Aserradero Moira, 1 EBD.

Genus *Platyrrhinus* Saussure, 1860

For use of *Platyrrhinus* instead of *Vampyrops*, see Gardner and Ferrell, 1990: 501.

The term "white-lined bat" has been used for members of the genus. White lines, however, occur in some other genera also.

Dental formula i2/2, c1/1, p2/2, m3/3, total 32. "Rostrum approximately three quarters as long as braincase, not inflated, and without a deep depression or long nasal emargination. Interpterygoid space not extended by a deep palatal emargination. Inner upper incisors elongate, more than twice length of outer upper incisors, not deeply bifid. Anterior lower molar with a postero-internal cusp" (Koopman, 1994: 87).

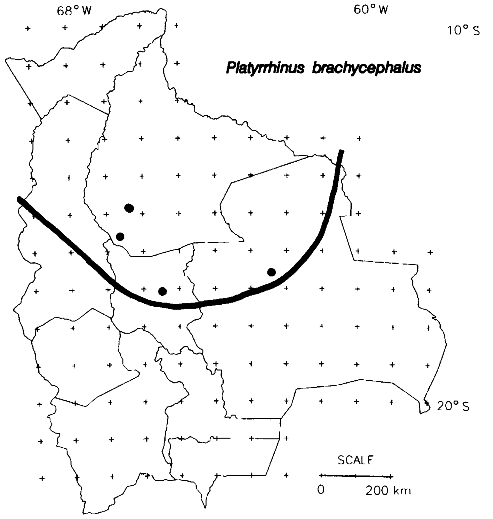


Fig. 567. Localities of known occurrence of *Platyrrhinus brachycephalus*.

Platyrrhinus brachycephalus (Rouk and Carter), 1972

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Vampyrops brachycephalus* was described by Rouk and Carter (1972: 1), type locality "3 mi. [= 5 km] S Tingo Maria, 2400 ft. [= 732 m], Huanuco, Peru."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size relatively small (forearm length, 36–42 mm; condylobasal length, 18–21 mm). Dorsal pelage brown with a fairly prominent dorsal stripe, but variably developed facial stripes. Edge of uropatagium fringed with short sparse hair. Rostrum and zygoma relatively broad and forehead relatively concave. Post-palatal extension relatively short. Posterior lower premolar with well-developed accessory cusps" (Koopman, 1994: 87). Measurements in tables 8 and 9 are of specimens from the río Cureraba (US 564320–564321) and Peru (AM 73990, 73993, 74013, 230637–230639).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 567.

No Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Two females taken in September had one embryo each.

Scientific synonyms used for Bolivian specimens are:

Vampyrops brachycephalus: Wilson and Salazar, 1990: 50 (Estación Biológica del Beni). Hinojosa *in* Estenssoro, 1992a (collected in Chimane region). Hinojosa, 1992b (Serranía Eva Eva).

Platyrrhinus brachycephalus: Ferrell and Wilson, 1991: 1 (name combination used in key to species of the genus). Anderson, 1993: 23 (general distributional records).

LOCALITIES (5) AND SPECIMENS (7): **Beni:** 1450/6623, Beni Reserve, río Cureraba, 2 US; 1451/6621, Totaisal, 1 CBF; 1536/6638, Serranía Eva Eva, 1 IE. **Cochabamba:** 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 1 AM, 1 MSB. **Santa Cruz:** 1635/6225, San Ramón, Castedo, 1 MNK.

Platyrrhinus dorsalis (Thomas), 1900

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Vampyrops dorsalis* was described by Thomas (1900a: 269); type locality Paramba, 1100 m elevation, Ecuador.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size medium (forearm length, 45–50 mm; condylobasal length, 24–27 mm). Dorsal pelage blackish brown with prominent dorsal and facial stripes. Edge of uropatagium with a moderate fringe of hair. Inner upper incisors large and strongly convergent. Rostrum relatively broad (width across upper molars, 10.2–12.3 mm)" (Koopman, 1994: 87). Measurements in tables 8 and 9 are of specimens from 50 km NW of Villa Tunari (UM 126759–126760), 3 km S and 3 km W of Santiago de Chiquitos (AM 261042—261056), and 35 km N of Caranavi (AM 246610–246614).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 568.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Vampyrops dorsalis: Barquez and Olrog, 1980: 54 (2 from Yungas de Totora). Anderson et al., 1982: 7. Myers and Wetzel, 1983: 14 (Santiago). Barquez, 1984a: 221 (Yungas de Totora). Anderson, 1985b: 7 (name in list). Ibáñez, 1985: 330 (1707/6544). Eisenberg, 1989: 155 (mentioned Bolivia).

Platyrrhinus dorsalis: Ferrell and Wilson, 1991: 1 (name combination used in key). Anderson,

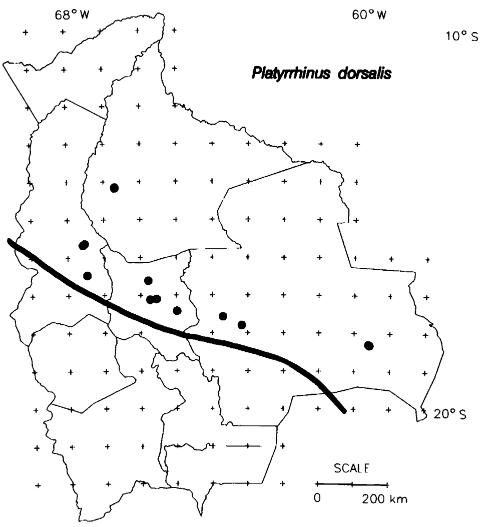


Fig. 568. Localities of known occurrence of *Platyrrhinus dorsalis*.

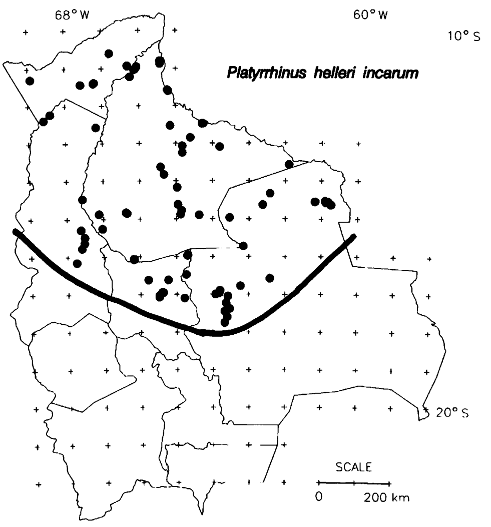


Fig. 569. Localities of known occurrence of *Platyrrhinus helleri incarum*.

1993: 23 (general distributional records). Anderson et al., 1993: 24 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (12) AND SPECIMENS (78): **Beni:** 1413/6640, Espíritu, 1 IE. **Cochabamba:** 1637/6547, 50 km NW of Villa Tunari, 2 UMMZ; 1706/6533, El Palmar, río Cochi Mayu, 1 AM, 1 CBF, 1 MSB; 1707/6544, El Sillar, or Puerto del Sillar, 5 EBD; 1725/6459, Yungas of Totora, río Yanimayo, 80 km N of Monte Punco, 2 (Barquez and Olrog, 1980), 1 IML (Barquez, 1984). **La Paz:** 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 26 LSU; 1540/6735, 35 km by road N of Caranavi, at Serranía Bellavista, 6 AM, 11 LSU; 1628/6728, Irupana, 1 IE. **Santa Cruz:** 1734/6342, 3 km N and 13.5 km W of San Rafael de Amboró, río Saguayo, 1 AM; 1748/6310, Santa Cruz de la Sierra, 3 CM; 1818/5936, 3 km by road S and 3 km by road W of Santiago de Chiquitos, 15 AM; 1819/5934, Santiago, in province of Chiquitos, 1 FM.

Platyrrhinus helleri (Peters), 1867

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Vampyrops helleri* was named by Peters (1866b: 392), type locality Mexico. *Vampyrops zarhinus incarum* was described by Thomas (1912b: 409), type locality "Pozuzo, Peru."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size relatively small (forearm length, 35–41 mm; condylobasal length, 18–21 mm). Dorsal pelage light to medium brown with prominent dorsal and facial stripes. Edge of uropatagium densely fringed with hair. Rostrum and zygoma relatively slender and forehead relatively flat. Post-palatal extension relatively long. Posterior lower premolar with accessory cusps usually poorly developed" (Koopman, 1994: 88). Measurements in tables 8 and 9 are of specimens from Santa Ana de Madidi (AM 261629—261630, 261635–261636, 261638–261639, 261642–261647, MSB 57296–57323), 6 km W of Casarabe (AM 255918–255919, 255921–255923, 255927), 47 km N of Caranavi (LSU 22718), and Estancia Cachuela Esperanza (AM 260217–260218, 260225).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 569.

No Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Seventeen pregnant females (one embryo each) were taken in July (2), August (11), September (3), and October (1).

Scientific synonyms used for Bolivian specimens are:

Platyrrhinus helleri incarum (Thomas), 1912

Vampyrops helleri: Barquez, 1977. Ojeda and Barquez, 1978: 37 (specimens from 7 km N of Santa Rosa). Ibáñez, 1985: 330 (1658/6349). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Wilson and Salazar, 1990: 50 (cited Anderson-Yates collection, one specimen).

Vampyrops helleri incarum: Koopman, 1976: 46. Anderson et al., 1982: 7. Anderson and Webster, 1983: 3 (río Nareuda, Tumichucua). Webster and Fugler, 1984: 17 (Tumichucua, Tomonoco, Caranavi, Guayaramerin). Anderson, 1985b: 7 (name in list).

Platyrrhinus helleri: Ferrell and Wilson, 1991: 1 (general information on the species, explains the use of *Platyrrhinus*). Emmons and Smith, 1992 (Centro Dieciocho).

Platyrrhinus helleri incarum: Anderson, 1993: 23 (general distributional records). Anderson et al., 1993: 24 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (87) AND SPECIMENS (426): **Beni:** 1048/6525, Guayaramarin, on island, 1 AM; 1049/6525, Guayaramarin, 3 AM, 9 (Webster and Fugler, 1984); 1052/6525, 5 km S of Guayaramarin, 5 AM; 1113/6614, Tumichucua, 24 LSU; 1134/6513, 5 km SW of Buena Hora [Brazil], 1 AM; 1136/6512, 6 km S of Buena Hora, 2 AM; 1229/6415, 4 km above Costa Marques [Brazil], on río Iténez,1 AM; 1229/6417, left bank of río Iténez, opposite Costa Marques, 8 AM; 1232/6509, 17 km NNW of Nuevo Berlin, 1 AM; 1251/6436, La Esperanza, 4 FM; 1304/6449, San Joaquín, 8 FM; 1306/6348, Buenavista, 6 FM; 1315/6449, Yutiole, 3 AM; 1334/6154, Remansos, 1 AM; 1338/6525, río Yacuma, 2 km from mouth, 1 AM; 1350/6520, río Mamoré, 1 AM; 1410/6458, río Tijamuchi, 4 km from mouth, 2 AM; 1428/6734, Rurrenabaque, 1 IE; 1437/6457, mouth of río Ibare, 2 AM; 1447/6451, Puerto Almacen, 2 AM; 1450/6623, 5 km N of El Porvenir, 1 MNLP, 1 US; 1450/6623, río Curiraba, 1 CBF, 1 US; 1451/6621, Estación Biológica del Beni, 1 AM; 1451/6621, Florida, 1 EBD; 1451/6621, Totaisal, 1 CBF; 1452/6707, Km 35, NW of Yucumo, 2 AMNH, 1 CBF, 1 MSB; 1453/6453, 15 km SE of Puerto Julio, 1 AM; 1454/6422, 6 km W of Casarabe, 6 AM; 1515/6702, Serranía Pilón, 27 km by road N of río Quiquibay, 19 AM; 1550/6441, 5 km NW of mouth of río Grande, 7 AM; 1602/6610, Oromomo, 2 CBF. **Cochabamba:** 1558/6442, mouth of río Chapare, 1 AM; 1637/6514, Puerto San Francisco, 1 US; 1637/6547, 50 km NW of Villa Tunari, 3 AM; 1657/6522, 4 km SE of Villa Tunari, 1 UMMZ; 1657/6523, 2 km E of Villa Tunari, 2 AM; 1657/6523, Las Pozas, Villa Tunari, 2 EBD; 1657/6524, 0.5 km NE of Villa Tunari, 1 UMMZ; 1702/6529, 3 km SW of Villa Tunari, 2 AM; 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 1 MSB; 1706/6447, Sajta, 3 AM, 2 CBF, 1 MSB. **La Paz:** 1234/6710, Santa Ana de Madidi, 16 AM, 41 MSB, 9 CBF; 1517/6737, 20 km by river N Puerto Linares, 26 LSU; 1517/6737, Sararia, 6 UMMZ; 1529/6731, Tomonoco, 1 mi [= 1.6 km] W of Puerto Linares, 18 MSU, 17 TTU; 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 2 LSU; 1546/6736, Caranavi, 3 MSU, 1 TTU; 1609/6745, Chijchijpa, 1114m, 1 AMNH. **Pando:** 1036/6647, Centro Dieciocho, 1 CBF (Emmons and Smith, 1992); 1056/6618, Remanso, 2 AM, 2 MSB; 1057/6603, left bank of río Beni, 1 AM; 1101/6606, W bank río Beni, opposite Hamburgo, 2 AM; 1102/6607, Las Piedras, 1 AM; 1117/6855, río Nareuda, 2 AM; 1123/6712, Bella Vista, 1 MSB; 1124/6713, La Cruz, 2 AM, 1 MSB; 1126/6734, Independencia, 3 AM; 1213/6824, Santa Rosa, 6 AM, 4 MSB; 1223/6835, Isla Gargantua, 1 MSB. **Santa Cruz:** 1420/6225, Projecto río Negro-Blanco, 3 MNK; 1432/6054, 3.5 km from Los Fierros, Campamento Precámbico, 1 EBD; 1433/6049, 17 km S of Campamento Los Fierros, 1 MSB; 1433/6054, Parque Nacional "Noel Kempff Mercado," 1 MNK; 1433/6054, Camp "los Fierros," 1 AM, 1 EBD, 2 MNK, 1 MSB; 1433/6111, río Paragua, Aserradero Moira, 1 EBD; 1433/6110, 4 km E of Aserradero Moira, 4 EBD; 1434/6053, 3 km S of Campamento Los Fierros, 3 AM; 1438/6044, 27.5 km S of Campamento Los Fierros, 4 AM, 5 MNK, 3 MSB; 1438/6044, 55 km E of Aserradero Moira, 3 EBD; 1438/6045, 23 km S of Campamento Los Fierros, 9 AM, 2 MSB; 1438/6237, Perseverencia, 4 MNK; 1458/6332, Pajaral, 1 MNK; 1543/6309, 6 km by road W of Ascención, 1 AM; 1557/6441, 2 km N of mouth of río Chapare, 2 AM; 1629/6444, río Ichilo, 54 km S of río Chapare mouth, 2 AM; 1635/

6225, San Ramón, Castedo, 5 MNK; 1647/6314, Estancia Cachuela Esperanza, 12 AM, 1 MNLP, 7 MSB; 1654/6348, La Ponderosa, Santa Rosa, 1 EBD; 1658/6349, 25 km NW of Santa Rosa de Sara (Ibáñez, 1985); 1700/6355, Ayacucho, 2 AM; 1703/6335, 7 km N of Santa Rosa, in province of Sara, 4 AM; 1714/6338, 4.5 km N of Buen Retiro, 1 AM; 1723/6332, San Miguel Rincón, 2 AM, 1 MSB; 1727/6340, Buenavista, 3 CM, 1 MACN; 1736/6336, San Rafael de Amboró, 5 AM, 2 MSB; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 1 AM. **Department unknown:** 1 MSB.

Platyrrhinus infuscus
(Peters), 1880

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Vampyrops infuscus* was described by Peters (1880: 259), type locality Hacienda Ninabamba, Hualgayoc, department of Cajamarca, Peru.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size relatively large (forearm length, 53–60 mm; condylobasal length, 26–29 mm). Dorsal pelage brown with poorly developed dorsal and facial stripes. Edge of uropatagium with short hair" (Koopman, 1994: 87). Measurements in tables 8 and 9 are of specimens from 47 km N of Caranavi (LSU 22707, 22968–22979), 6.6 km downstream from Caranavi (AM 246621), and 35 km N of Caranavi (AM 246622–246623).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 570.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Vampyrops infuscus: Barques and Olrog, 1980: 53 (specimen from Cochabamba). Anderson et al., 1982: 7. Anderson and Webster, 1983: 3 (río Nareuda). Anderson, 1985b: 7 (name in list).

Platyrrhinus infuscus: Ferrell and Wilson, 1991: 1 (name combination used in key). Anderson, 1993: 23 (general distributional records). Anderson et al., 1993: 24 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (17) AND SPECIMENS (39): **Beni:** 1515/6702, Serranía Pilón, 27 km by road N of río Quiquibay, 1 AM; 1517/6704. Serranía de Pilón, 1 CBF. **Cochabamba:** 1657/6522, 4 km SE of Villa Tunari, 1 USNZ; 1657/6523, Balneario Las Pozas, Villa Tunari, 3 EBD; 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 2 AM, 1 CBF, 2 MSB; 1706/6447, Sajta, 1 AM; 1706/6533, El Palmar, río Cochi Mayu, 1 CBF; 1725/6459, Yungas de Totora, 1 Instituto Miguel Lillo (Barques and Olrog, 1980). **La Paz:** 1517/6737, 20 km by river N Puerto Linares, 2 LSU; 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 13 LSU; 1538/6739, 6.6 km downstream from Caranavi, in valley of río Coroico, 1 AM; 1540/6735, 35 km by road N of Caranavi, at Serranía Bellavista, 3 AM. **Pando:** 1117/6855, río Nareuda, 2 AM. **Santa Cruz:** 1736/6336, San Rafael de Amboró, 1 AM; 1743/6338, río Pitasama, 1 MNK; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 1 MSB; coordinates unknown, río Yapoje, Amboró, 1 MNK.

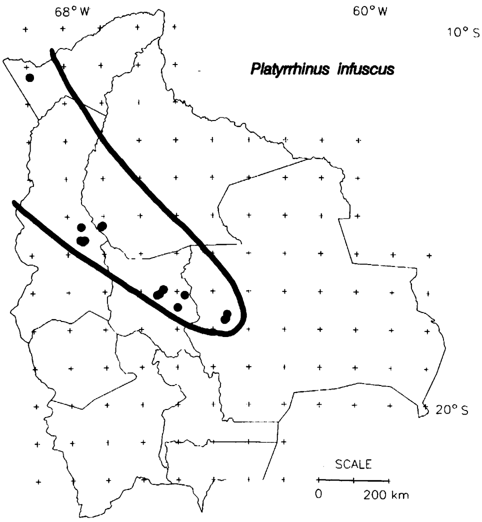


Fig. 570. Localities of known occurrence of *Platyrrhinus infuscus*.

Platyrrhinus lineatus
(É. Geoffroy Saint-Hilaire), 1810

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Phyllostoma lineatum* was described by É. Geoffroy Saint-Hilaire (1810: 180); type locality restricted to Asun-

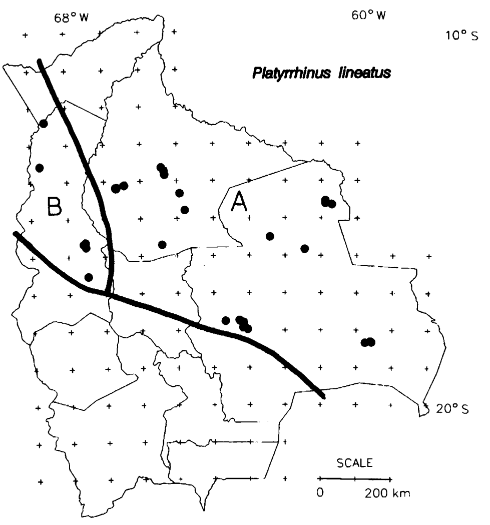


Fig. 571. Localities of known occurrence of two subspecies of *Platyrrhinus lineatus*, *P. l. lineatus* (A) and *P. l. nigellus* (B).

ción, Paraguay, by Cabrera (1958: 80). *Vampyrops nigellus* was described by Gardner and Carter (1972: 1), type locality Huanhuachayo, 12°44′S and 73°47′W, ca. 1660 m elevation, Ayacucho, Peru, and has subsequently been regarded as either a species or subspecies.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size medium (forearm length, 38–49 mm; condylobasal length, 21–24 mm). Dorsal pelage dark brown with prominent dorsal stripe but variably developed facial stripes. Edge of uropatagium fringed with hair. Inner upper incisors robust" (Koopman, 1994: 87).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 571.

HABITAT: The species was seen near Espíritu under a leaf of *Copernicia alba* some 3 to 5 m from the ground (Aguirre, 1994: 99).

HABITS AND BEHAVIOR: In a study during the 12 hours of darkness at Espíritu, Beni (Aguirre, 1994: 89), specimens were netted at various times throughout the night, but the peak of activity was in the first part of the night.

FOOD: No Bolivian data available.

REPRODUCTION: Three pregnant females (one with one embryo and one with two) of *P. l. lineatus* were taken in July.

Scientific synonyms used for Bolivian specimens are given under the subspecies below.

Platyrrhinus lineatus lineatus
(É. Geoffroy Saint-Hilaire), 1810

Vampyrops lineatus: Sanborn, 1932a: 178 (Santa Cruz de la Sierra); 1955: 410 (Cercado). Myers and Wetzel, 1983: 15 (Santiago). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Ibáñez and Ochoa, 1989: 216 (38 km E of La Florida). Wilson and Salazar, 1990: 50 (in list for Estación Biológica del Beni; cited Anderson-Yates collection, one specimen). Barquez and Ojeda, 1992: 245 (mention Bolivian record in the Chaco).

Vampyrops lineatus lineatus: Koopman, 1978: 10 (in the form *V. l. lineatus*). Anderson et al., 1982: 7. Anderson, 1985b: 7 (name in list). Willig and Hollander, 1987: 1 (general information).

Platyrrhinus lineatus: Ferrell and Wilson, 1991: 1 (name combination used in key). Aguirre, 1994: 56 (22 specimens from 10 localities near Espíritu).

Platyrrhinus lineatus lineatus: Anderson, 1993: 24 (general distributional records). Anderson et al., 1993: 24 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (27) AND SPECIMENS (140): **Beni:** 1338/6525, río Yacuma, 2 km from mouth, 1 AM; 1343/6521, Puerto Caballo, 1 AM; 1350/6520, río Mamoré, 2 AM; 1410/6640, 1411/6638, 1412/6640, and 1413/6640, 22 (Aguirre, 1994: 66); 1413/6640, Espíritu, 1 IE; 1420/6455, 10 km W of San Pedro, 1 AM; 1447/6447, Trinidad, 1 MSB; 1545/6523, Puerto San Lorenzo of río Sécure, 1 CBF. **Santa Cruz:** 1432/6053, 3.5 km N of Los Fierros, Campamento Precámbrico, 2 EBD; 1433/6053, Los Fierros, 9 EBD, = 1436/6053, 38 km E of La Florida (Ibáñez and Ochoa, 1989); 1438/6042, El Encanto, 2 CBF + LHE 769 and 770; 1530/6225, Puerto Almacen, 1 Venice; 1550/6127, Santa Rosa de la Roca, 2 AM, 1 MNK, 1 MSB; 1744/6317, 8 km W of Santa Cruz, 4 MSB; 1745/6315, Cercado, 1 FM; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 1 AM; 1747/6310, Santa Cruz Zoo, 5 AM, 1 EBD, 1 Hayward coll., 2 MNK, 20 MSB; 1748/6310, Santa Cruz de la Sierra, 3 CM;

1755/6308, 15 km S of Santa Cruz, 3 MSB; 1756/6311, 12 km S and 8 km E of Santa Cruz, 2 AM; 1758/6303, 27 km SE of Santa Cruz, 10 MSB; 1818/5936, 4 km N and 1 km W of Santiago de Chiquitos, 1 AM; 1819/5934, Santiago, province of Chiquitos, 33 FM; 1820/5945, Roboré, 2 AM, 1 MSB.

Measurements in tables 8 and 9 are of specimens from Roboré (AM 260232—260233, MSB 55175), Santa Cruz de la Sierra (CM 1940–1942), Santiago (FM 105844–105862), and the río Mamoré at 13°50′S (AM 210805–210806).

Platyrrhinus lineatus nigellus
(Gardner and Carter), 1972

Vampyrops lineatus nigellus: Koopman, 1978: 11. Anderson et al., 1982: 7. Anderson, 1985b: 7 (name in list). Willig and Hollander, 1987: 1 (general information).

Platyrrhinus lineatus nigellus: Anderson, 1993: 24 (general distributional records).

Localities (7) and Specimens (35): **Cochabamba:** coordinates unknown, Sehuenca, 1 MNK. **La Paz:** 1334/6844, Aserradero Moira, Alto Madidi, 1 MNLP; 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 25 LSU; 1540/6735, 35 km by road N of Caranavi, at Serranía Bellavista, 5 AM; 1545/6731, 1 km S of La Reserva, 1 CBF; 1632/6728, Lavi Grande, 6 km S of Irupana, 1 CBF. **Pando:** 1223/6835, Chivé, 1 MNLP.

Measurements in tables 8 and 9 are of specimens from 35 km N of Caranavi (AM 246616–246620) and 47 km N of Caranavi (LSU 22715, 22889, 22891, 22902, 22904, 22906).

Platyrrhinus vittatus
(Peters), 1860

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Artibeus vittatus* was described by Peters (1860a: 225), type locality Puerto Cabello, Carabobo, Venezuela.

Morphological Characters and Comparisons: "Size relatively large (forearm length, 57–65 mm; condylobasal length, 28–32 mm). Dorsal pelage blackish brown with prominent dorsal and facial stripes. Edge of uropatagium conspicuously fringed with hair" (Koopman, 1994: 87). Measurements in tables 8 and 9 are of specimens from Colombia (AM 15100) and the Yungas de Totora (Barquez and Ojeda, 1980).

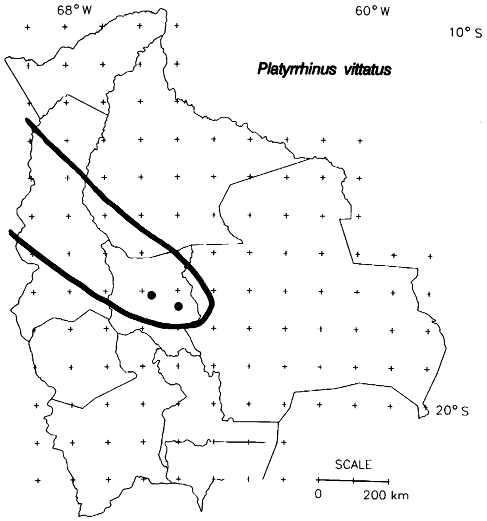


Fig. 572. Localities of known occurrence of *Platyrrhinus vittatus*.

Distributional Notes: Known localities are listed below and mapped in figure 572.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Vampyrops vittatus: Peters, 1865a: 356 (first use of name combination). Barquez and Olrog, 1980: 54 (Yungas de Totora). Anderson et al., 1982: 7. Barquez, 1984a: 221 (Yungas de Totora). Anderson, 1985b: 7 (name in list). Ibáñez, 1985: 330 (1707/6544).

Platyrrhinus vittatus: Ferrell and Wilson, 1991: 1 (name combination used in key). Anderson, 1993: 24 (general distributional records).

Localities (2) and Specimens (9): **Cochabamba:** 1707/6544, El Sillar, or Puerto del Sillar, 1 EBD; 1725/6459, Yungas of Totora, río Yanimayo, 80 km N of Monte Punco, 5 (Barquez and Olrog, 1980); 1 (Barquez, 1984a); 2 IML (not examined).

Platyrrhinus,
species not determined

Localities (2) and Specimens (2): **Beni:** 1451/6621, 5 km N of El Porvenir, 1 MNLP. **Santa Cruz:** 1736/6336, San Rafael de Amboró, 1 MSB.

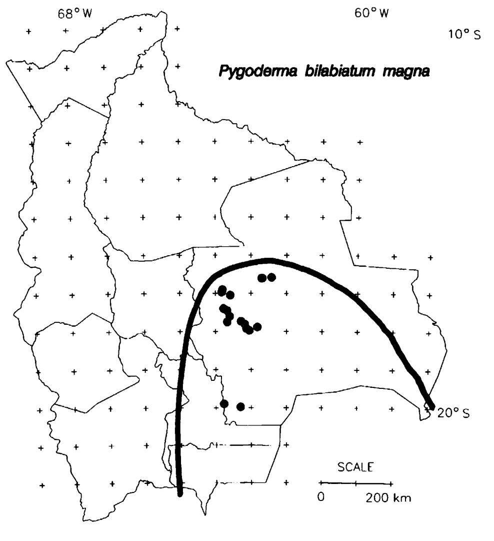


Fig. 573. Localities of known occurrence of *Pygoderma bilabiatum magna.*

Genus *Pygoderma* Peters, 1863

Dental formula i2/2, c1/1, p /2, m2/2, total 28. "Rostrum almost as long as braincase, inflated (almost cuboid), but without a depression or nasal emargination. Interpterygoid space not extended by a palatal emargination. Inner upper incisors large, slightly higher than long, outers greatly reduced. Forehead flat" (Koopman, 1994: 93).

Pygoderma bilabiatum (Wagner), 1843

A vernacular name is Ipanema bat after the type locality.

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Phyllostoma bilabiatum* was named by Wagner (1843: 366), type locality "Ypanema" [= Ipanema], São Paulo, Brazil.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 8 and 9 are of specimens from San Rafael de Amboró (AM 261758–261761, 261763), 25 km W of Buena Vista (UM 156057), and 7 km N of Santa Rosa (AM 246401—246408).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 573.

No Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: One female in September had one embryo. Nonpregnant females were recorded in May (3) and June (3). One female was lactating in May.

Scientific synonyms used for Bolivian specimens are:

Pygoderma bilabiatum magna Owen and Webster, 1983

Pygoderma bilabiatum: Barquez, 1977. Ojeda and Barquez, 1978: 37 (12 from 7 km N of Santa Rosa). Anderson et al., 1982: 10. Eisenberg, 1989: 175 (mentioned Bolivia). Emmons and Feer, 1990: 77 (mentioned Bolivia). Van Den Bussche, 1992: 42 (San Rafael de Amboró). Ibáñez et al., 1994: 80 (first specimens from Chuquisaca).

Pygoderma bilabiatum magna Owen and Webster, 1983: 146 (type locality "Ichilo, 7 km N Santa Rosa, 800 m, Santa Cruz, Bolivia" but actually in the province of Sara rather than Ichilo). Webster and Owen, 1984: 2. Anderson, 1985b: 8 (name in list). Ibáñez, 1985: 330 (1636/6241, 1658/6349). Anderson, 1993: 24 (general distributional records). Anderson et al., 1993: 26 (vicinity of Santa Cruz de la Sierra). Lawrence, 1993: 40 (1703/6335). Koopman, 1994: 93 (general characters and distribution, photo of skull AMNH 246398 from 7 km N of Santa Rosa on p. 173).

LOCALITIES (18) AND SPECIMENS (53): **Chuquisaca:** 1954/6346, 81 km from Ipati, pasado Mullu-Pampa, 2 EBD. **Santa Cruz:** 1635/6225, 2 km N and 10 km E of San Ramón, 1 AM, 1 MNK, 1 MSB; 1635/6225, 14 km NE of San Ramón, 1 AM, 1 MNK, 1 MSB; 1636/6241, La Laguna, 10 km N of San Ramón, 1 EBD; 1636/6242, 10 km N of San Ramón, 1 MSB; 1654/6348, La Ponderosa, Santa Rosa, 1 EBD; 1658/6349, 25 km NW of Santa Rosa de Sara, 1 (Ibáñez, 1985); 1703/6335, 7 km N of Santa Rosa, 12 AM; 1724/6346, 25 km by road W of Buenavista, on west bank of río Yapacaní, 1 UMMZ; 1727/6340, Buenavista, 1 MACN; 1736/6336, San Rafael de Amboró, 6 AM, 3 MSB; 1744/6317, 8 km W of Santa Cruz, 6 MSB; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 1 AM; 1748/6311, El Cedrito, 1 MNK; 1753/6249, Lomas de Arena, 1 MNK; 1755/6308, 15 km S of Santa Cruz, 3 MSB; 1758/6303, 27 km SE of Santa Cruz, 6 MSB; 1959/6318, 72 km ESE of Monteagudo, 1 FM.

Genus *Sphaeronycteris* Peters, 1882

Only one species known.

Sphaeronycteris toxophyllum
Peters, 1882

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Sphaeronycteris toxophyllum* was described by Peters (1882: 989); type locality restricted to Pebas, department of Loreto, Peru, by Cabrera (1958: 92).

Morphological Characters and Comparisons: Dental formula i2/2, c1/1, p2/2, m3/3, total 32. "Rostrum less than half length of braincase, greatly modified by retraction of external nares. Interpterygoid space broad but clearly evident, and extended by a V-shaped palatal emargination. Inner upper incisors elongate, more than twice length of greatly reduced outers. Forehead sharply concave. Anterior margin of orbit extended to form a conspicuous plate. True noseleaf considerably reduced in height, but with a ridge-like outgrowth behind it, greatly enlarged in males" (Koopman, 1994: 93). Measurements in tables 8 and 9 are of specimens from opposite Costa Marques (AM 209740), 1.5 km below Costa Marques (AM 209741), Santa Ana de Madidi (AM 261765), and Independencia (AM 262637).

Distributional Notes: Known localities are listed below and mapped in figure 574.

No Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: One female taken in September had one embryo.

Scientific synonym used for Bolivian specimens is:

Sphaeronycteris toxophyllum: Koopman, 1976: 46 (three Bolivian specimens). Ibáñez, 1981: 125 (map). Anderson et al., 1982: 10. Anderson and Webster, 1983: 3 (Tumichucua). Webster and Fugler, 1984: 17 (Tumichucua). Anderson, 1985b: 8 (name in list). Emmons and Feer, 1990: 78 (mentioned Bolivia). Anderson, 1993: 24 (general distributional records).

Localities (9) and Specimens (11): **Beni:** 1113/6614, Tumichucua, 1 LSU; 1229/6417, left bank of río Iténez, opposite Costa Marques [Brazil], 1 AM; 1229/6418, 1.5 km below Costa Marques, on río Iténez, 1 AM; 1230/6418, mouth of río Baures, 1 AM. **La Paz:** 1234/6710, Santa Ana de Madidi, 1 AM. **Pando:** 1126/6734, Independencia, 1 AM; 1128/6750, 15 km NW of Puerto Camacho, 1 CBF; 1216/6827, 8 km SO de [= SW of] Santa Rosa, 2 CBF. **Santa Cruz:** 1420/6225, PRNB, 2 MNK.

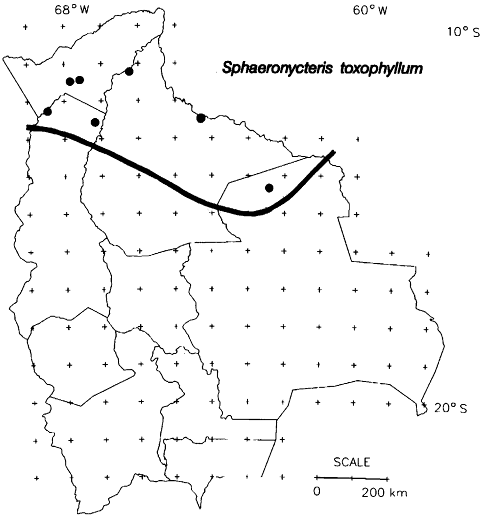


Fig. 574. Localities of known occurrence of *Sphaeronycteris toxophyllum*.

Genus *Sturnira* Gray, 1842

The term "yellow-shouldered bat" has been used for members of the genus. Formerly placed in a separate subfamily, the Sturnirinae, or a tribe Sturnirini Miller, 1907. "Crowns of molars with distinct longitudinal grooves, the cusps strictly lateral. Uropatagium virtually absent .... Dental formula usually i2/2, c1/1, p2/2, m3/3×2 = 32, but in one species [in subgenus *Corvira*, not known from Bolivia] i2/1," total 30" (Koopman, 1994: 85).

Five of 12 living species of *Sturnira* are known from Bolivia.

Sturnira erythromos
(Tschudi), 1844

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Phyllostoma erythromos* was described by Tschudi (1844: 64), type locality Peru. The name combination *Sturnira*

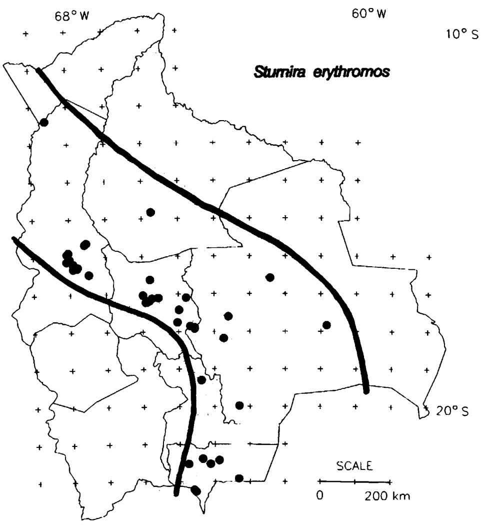


Fig. 575. Localities of known occurrence of *Sturnira erythromos*.

erythromos was first used by de la Torre (1961: 124).

Morphological Characters and Comparisons: "Lingual cusps of anterior and middle molars (metaconid and entoconid) poorly defined, no vertical notches. Size relatively small (forearm length, 38–46 mm; condylobasal length, 18—21 mm). Inner upper incisors pointed, their tips not in contact" (Koopman, 1994: 85). Measurements in tables 8 and 9 are of specimens from 30.7 km downstream from Lago Zongo (AM 246569, 246571–246572) and 35 km N of Caranavi (AM 246574).

Distributional Notes: Known localities are listed below and mapped in figure 575.

No Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: No pregnant females were recorded. Nonpregnant females were recorded in May (1), June (6), July (3), and August (2).

Scientific synonym used for Bolivian specimens is:

Sturnira erythromos: Webster and Jones, 1980: 3 (four from Sacramento Alto). Anderson et al., 1982: 6. Barquez, 1984a: 220 (80 km N of Mont Punco). Webster and Fugler, 1984: 17 (Sacramento Alto). Anderson, 1985b: 7 (name in list). Ibáñez, 1985: 330 (1707/6544). Pacheco and Patterson *in* Young and Valencia, 1992: 79 (Tarija and 25 km NW of Entre Ríos). Anderson, 1993: 23 (general distributional records). Anderson et al., 1993: 23 (vicinity of Santa Cruz de la Sierra).

Localities (44) and Specimens (237): **Beni:** 1450/6544, 5 km N of El Porvenir, 1 MNLP. **Chuquisaca:** 1918/6422, 9 km by road N of Padilla, 2000 m elevation, 1 AM. **Cochabamba:** 1637/6547, 50 km NW of Villa Tunari, at Puerto Patiño, 1 UMMZ; 1702/6559, 9.4 km by road N of Tablas Monte, 1 MSB; 1706/6533, El Palmar, río Cochi Mayu, 3 AM, 5 CBF, 3 MSB; 1707/6544, El Sillar, or Puerto del Sillario, 10 EBD (Ibáñez, 1985); 1711/6548, Bajada Cochabamba al Chapare, 6 EBD; 1713/6552, Corani, 10 AM, 11 CBF, 10 MSB; 1713/6554, 13 km N of Colomi, 1 AM, 2 MSB; 1706/6447, Sajta, 1 AM, 1 MSB; 1725/6459, Yungas de Totora, 80 km N of Monte Punco, 3, (Barques, 1984a); 1745/6502, 17 km E of Totora, Tinkusiri, 1 AM; 1751/6440, 25 km by road W of Comarapa, in Siberia Cloud Forest, 12 UMMZ; 1751/6440, 28 km W of Comarapa, 2 FM; 1751/6440, 30 km W of Comarapa, 1 FM; 1751/6440, Siberia, 30 km NW of Comarapa, 1 EBD. **La Paz:** 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 7 LSU; 1540/6735, 35 km by road N of Caranavi, at Serranía Bellavista, 1 AM, 6 LSU; 1553/6802, 30 km by road N of Zongo, at "cement mine" [i.e., cement factory], 1 UMMZ; 1555/6804, valley of río Zongo, 30.7 km by road downstream from Lago Zongo, 12 AM; 1603/6800, Zongo Valley, 2650 m elevation, 3 MNLP; 1607/6805, 0.5 km E of Saynani, 6 AM, 3 CBF, 2 MSB; 1611/6754, 4 km N of Cota Pata, 1 AM; 1612/6754, Sandillani, 1 EBD; 1613/6754, Cotapata, 4.5 km by road WNW of Chuspipata, 36 LSU; 1616/6747, Sacramento Alto, 8 km by road N of Chuspipata, 2 MSUMZ, 2 TTU; 1618/6748, 1 km S Chuspipata, 1 LSU; 1619/6754, Unduavi, 59 km NE of La Paz, 21 EBD; 1628/6728, Irupana, 1 IE. **Pando:** 1223/6835, Chivé, 1 CBF. **Santa Cruz:** 1635/6225, San Ramón, Castedo, 1 MNK; 1736/6336, San Rafael de Amboró, 1 AM; 1750/6050, San José de los Chiquitos, 1 IML; 1753/6433, El Tunal, Cantón Comarapa, 1 AM; 1755/6433, Siberia, 11 km [by road] NW of Comarapa, 3 EBD; 1811/6344, 1 km NE Estancia Cuevas, 3 AM, 1 MNK, 2 MSB; 1959/6318, 72 km ESE of Monteagudo, 1 FM. **Tarija:** 2123/6421, 25 km NW of Entre Ríos, 10 FM; 2125/6353, 108 km ENE of Tarija, 10 FM; 2131/6408, 67 km E of Tarija, 1 FM; 2131/6445, Tarija, 2 FM; 2155/6319, 40 km E of Yacuiba, Gran Chaco, 1 CBF; 2213/6436, 4 km by road N of Cuyambuyo, at paper factory, 2 UMMZ; 2216/6433, 3 km SE of Cuyambuyo, 2 AM, 1 CBF.

Sturnira lilium (É. Geoffroy Saint-Hilaire), 1810

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Phyllostoma lilium* was described by É. Geoffroy Saint-Hilaire (1810: 181); type locality restricted to Asuncion, Paraguay, by Cabrera (1958: 78).

Morphological Characters and Comparisons: "Lingual cusps of anterior and middle lower molars (metaconid and entoconid) well defined by vertical notches. Size fairly small (forearm length, 37–44 mm; condylobasal length, 19—22 mm). Zygomatic arch and maxillary toothrow curved laterally" (Koopman, 1994: 85). Measurements in tables 8 and 9 are of specimens from opposite Cascajal (AM 210724–210727), 2 km E of Villa Tunari (AM 248100–248101, 248106), and 3 km SW of Villa Tunari (AM 244626).

Distributional Notes: Known localities are listed below and mapped in figure 576.

Habitat: A common species in most lowland Habitats: and ranging up to at least 3000 m in elevation in the Yungas.

Habits and Behavior: In a study during the 12 hours of darkness at Espíritu, Beni (Aguirre, 1994: 89), specimens were netted at various times between 1800 and 0200 hours.

Food: No Bolivian data.

Reproduction: Eleven females with single embryos were taken in July (1), August (3), September (6), and October (1). Four lactating females were taken in May (1), July (2), and August (1). Nonpregnant females (32) were taken in January (1), May (9), June (6), and July (16). One young individual was taken in May.

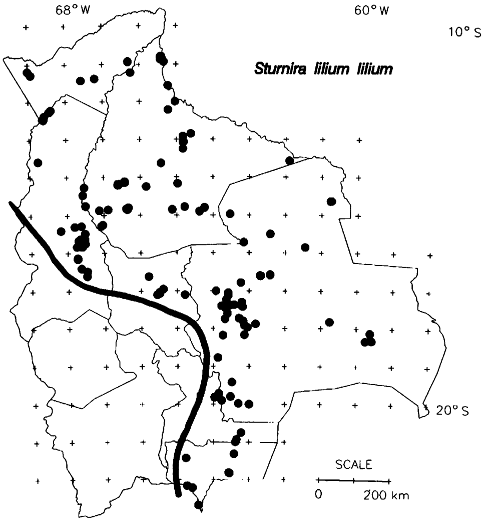


Fig. 576. Localities of known occurrence of *Sturnira lilium lilium.*

Scientific synonyms used for Bolivian specimens are:

Sturnira lilium lilium (É. Geoffroy Saint-Hilaire), 1810

Sturmia lilium: Thomas, 1898b: 3 (two from Caiza).

Sturnira lilium: Thomas, 1898b: 3 (Caiza). Sanborn, 1932a: 177 (three localities in Santa Cruz). Ojeda and Barquez, 1978: 36 (25 from 7 km N of Santa Rosa). Ibáñez, 1981: 106 (map). Myers and Wetzel, 1983: 13 (three places in Santa Cruz). Barquez, 1984a: 220 (San José de Chiquitos, Santa Cruz de la Sierra, 7 km N of Santa Rosa). Ibáñez, 1985: 330 (1636/6241). Sawada and Harada, 1986: 368 (Nueva España, Chivé, El Naranjal). Wilson and Salazar, 1990: 50 (Estación Biológica del Beni). Emmons, 1991: 72 (seen at Alto río Madidi in La Paz department). Aguirre, 1994: 55 (seven localities near Espíritu).

Sturnira lilium lilium: de la Torre, 1961: 79 (Buenavista). Anderson et al., 1982: 6. Anderson and Webster, 1983 (río Nareuda, Tumichucua): 2. Webster and Fugler, 1984: 17 (Tumichucua, Caranavi, Tomonoco, Serranía Bella Vista, Rurrenabaque). Anderson, 1985b: 7 (name in list). Gannon et al., 1989: 1 (general information on the species). Anderson, 1993: 23 (general distributional records). Anderson et al., 1993: 23 (vicinity of Santa Cruz de la Sierra).

Sturnira lillium: Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni).

LOCALITIES (146) AND SPECIMENS (669): **Beni:** 1048/6525, 2 km N of Guayaramarin, on island, 1 AM; 1052/6525, 5 km S of Guayaramarin, 11 AM; 1056/6520, 8 km N of Santa Cruz, 1 AM; 1113/6614, Tumichucua, 1 LSU; 1134/6513, 5 km SW of Bueno Hora [Brazil], 1 AM; 1200/6502, río Iténez, 20 km above mouth, 1 AM; 1213/6513, opposite side of river from Cascajal, 4 AM; 1251/6436, La Esperanza, 2 FM; 1255/6449, Caravani, 1 FM; 1304/6448, Camino Vilches, on río Machupo, 4 FM; 1304/6449, San Joaquín, 14 FM; 1315/6449, Yutiole, 3 AM; 1334/6154, Remansos, 1 km below mouth of río Paragua, 3 AM; 1338/6525, río Yacuma, 2 km from mouth, 1 AM; 1410/6640, 1411/6638, 1413/6639, 1413/6640, 1413/6641, 1413/6640, all near Espíritu, 20 (Aguirre, 1994: 66); 1410/6458, río Tijamuchi, 4 km from mouth, 2 AM; 1415/6550, Venecia, 6 EBD; 1428/6734, Rurrenabaque, 6 AM; 1447/6447, Trinidad (Yepes, 1944); 1448/6414, Casarabe, 1 AM; 1448/6619, Campamento El Trapiche, 1 AM, 1 CBF; 1450/6622, Estancia Tajibos, 40 km E of San Borja, 2 MNLP; 1450/6623, 5 km N of Porvenir, 3 MNLP; 1450/6623, río Curireba, 1 US; 1451/6507, 38 km by road W of Trinidad, 3 AM; 1451/6621, río Matos, near Rancho Totaizal, 1 US; 1451/6621, Mato Totaizal, 55 km from San Borja, 3 EBD; 1451/6621, 50 km from San Borja on road to San Ignacio, 1 EBD; 1451/6621, Estación Biológica del Beni, 2 CBF, 4 US; 1451/6653, 3 km by road SW of San Borja, 1 AM; 1452/6707, Km 35, NW of Yucumo, 1 MSB; 1454/6422, 6 km W of Casarabe, 4 AM; 1515/6702, Serranía Pilón, 27 km by road N of río Quiquibay, 13 AM; 1517/6704, Serranía de Pilón, 1 AM, 1 CBF, 1 MSB; coordinates unknown, W bank of Laguna Bolivia, 1 CBF. **Chuquisaca:** 1943/6351, 2 km E of Chuhuayaco, 1200 m elevation, 1 AM, 1 MNLP; 1946/6353, Padilla, 70 km SE of, 1 FM; 1949/6358, 2 km SW of Monteagudo, 1130 m elevation, 1 MSB; 1954/6346, 81 km from Ipati, pasado Mullu-Pampa, 1 EBD; 2045/6313, Porvenir, 3 AM, 2 MSB; 2045/6313, 1.5 km NW of Porvenir, 14 AM, 6 MSB; 2045/6313, 1.3 km SW of Porvenir, 13 AM, 3 MSB; 2056/6321, 2 km S and 10 km E of Tiquipa, at Laguna Palmar, 2 AM. **Cochabamba:** 1637/6547, 50 km NW of Villa Tunari, at Puerto Patiño, 2 UMMZ; 1657/6523, 2 km E of Villa Tunari, 7 AM; 1657/6523, Las Pozas, Villa Tunari, 5 EBD; 1702/6529, 3 km SW of Villa Tunari, 3 AM; 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 1 CBF; 1706/6447, Sajta, 1 AM, 1 CBF; 1706/6533, El Palmar, río Cochi Mayu, 1 MSB; coordinates unknown, Campamento II (Univ. Cochabamba), 1 MNK. **La Paz:** 1335/6846, Alto río Madidi (Emmons, 1991: 72); 1416/6732, río Beni, 4 AM, 1 MSB; 1445/6730, río Quiquibay, 1 MNLP; 1517/6737, 20 km by river N of Puerto Linares, 3 LSU; 1517/6737, Sararia, 2 UMMZ; 1518/6748, 20 km NNE of Guanay, 2 UMMZ; 1524/6811, San Carlos, 3 BM; 1529/6731, Tomonoco, 1 mi [= 1.6 km] W of Puerto Linares, 14 MSU, 9 TTU; 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 17 LSU; 1538/6739, 6.6 km downstream from Caranavi, in río Coroico valley, 2 AM; 1540/6735, 35 km by road N of Caranavi, at Serranía Bellavista, 6 AM, 5 LSU, 1 MSU; 1540/6742, 4 km NW of Alcoche, 3 UMMZ; 1542/6735, 20 km NNE of Caranavi, 7 UMMZ; 1542/6740, Alcoche, 4 FM; 1545/6731, 1 km S of La Reserva, 1 CBF; 1546/6736, Caranavi, 24 MSU, 6 TTU; 1550/6736, Santa Ana on río Coroico, 2 ANSP; 1550/6745, río Zongo, 1500 m, 2 AM; 1608/6744, 3 km N of Coroico, Comunidad Marka, 2 AM; 1609/6744, Chijchijpa, 1224 m elevation, 7 AMNH, 2 MSB; 1623/6743, Yanacachi, 1 IE; 1624/6738, Tarila, 2 IE; 1629/6728, Irupana, 1 AM; 1636/6729, Pasto Grande, 1 MNLP. **Pando:** 1056/6618, Remanso, 1 AM, 6 CBF; 1111/6900, El Naranjal, Nazaret, 16 (Sawada and Harada, 1986: 369); 1117/6855, río Nareuda, 18 AM; 1123/6712, Bella Vista, 5 AM, 3 MSB; 1126/6734, Independencia, 5 AM; 1126/6734, right bank río Madre de Dios, opposite Independencia, 1 MSB; 1213/6824, Santa Rosa, 5 AM, 3 MSB; 1216/6827, 8 km SW of Santa Rosa, 1 CBF; 1223/6835, Isla Gargantua, 3 AM, 2 MSB; 1223/6835, Chivé, 7 MNLP, 25 (Sawada and Harada, 1986: 368, 369); 1228/6836, Nueva España, 5 (Sawada and Harada, 1986: 368). **Santa Cruz:** 1438/6044, 27.5 km S of Campamento Los Fierros, 1 AM; 1438/6045, 23 km S of Campamento Los Fierros, 1 AM, 2 MSB; 1458/6332, Pajaral, 1 MNK; 1530/6225, Puerto Almacen, 2 MNK, 2 Venice; 1543/6309, 6 km by road W of Ascención, 1 MSB; 1551/6127, 2 km SSE of Santa Rosa de la Roca, 2 AM, 2 MNK, 1 MSB; 1634/6225, río Quiser on road from San Ramón to Concepción, 1 AM; 1635/6225, San Ramón, Castedo, 6 MNK; 1635/6225, 2 km N and 10 km E of San Ramón, 1 AM; 1636/6241, Finca La Laguna, 9 km N of San Ramón, 13 EBD; 1636/6241, La Laguna, 10 km N of San Ramón (Ibáñez, 1985); 1636/6242, 10 km N of San Ramón, 1 AM; 1647/6314, Estancia Cachuela Esperanza, 8 AM, 2 MSB; 1700/6355, Ayacucho, 2 AM; 1703/6335, 7 km N of Santa Rosa, in province of Sara, 22 AM, + 3 (Ojeda and Barquez, 1978; Barquez, 1984a, cited 1 in Tucumán); 1707/6335, Santa Rosa de Sara, 1 EBD; 1714/6338, 4.5 km N of Buen Retiro, 1 MSB; 1718/6312, 2.5 km by road N and 8 km by road E of Montero, 1 AM; 1722/6325, province of Sara, 1 CM; 1722/6333, río Palometillas, 2 FM; 1723/6314, 3 km SE Montero, 1 km N of Villa Copacabana, 1 MSB; 1723/6332, San Miguel Rincón, 1 AM; 1724/6344, 7 km N and 17 km W of Buenavista, 4 AM; 1724/6346, 25 km by road W of Buenavista, on west bank of río Yapacaní, 1 UMMZ; 1725/6311, 10 km SE of Montero, 5 MSB; 1727/6340, Buenavista, 3 CM, 1 FM; 1728/6341, 4 km SW of Buena Vista, 2 MSB; 1736/6336, San Rafael de Amboró, 1 AM; 1744/6317, 8 km W of Santa Cruz, 10 MSB; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 1 AM; 1748/6310, Santa Cruz de la Sierra, 2 CM, 3 IML; 1749/6045, San José de Chiquitos, 1 (Barquez, 1984a); 1753/6249, Lomas de Arena, 4 MNK; 1755/6308, Palmasola, 2 CBF; 1758/6303, 27 km SE of Santa Cruz, 1 MNK, 24 MSB; 1807/5937, 24 km by road N of Santiago de Chiquitos, on río Tucavaca, 2 AM; 1810/6308, 15 km E of Ingeniero Mora, 1 AM; 1811/6344, 1 km NE Estancia Cuevas, 1 AM, 2 MNK; 1818/5936, 3 km by road S and 3 km by road W of Santiago de Chiquitos, 2 AM; 1819/5934, Santiago, in province of Chiquitos, 12 FM; 1820/5945, Roboré, 1 MSB; 1846/6352, 13 km by road NW Masicuri, 6 AM; 1925/6329, 10 km by road E of Gutierrez, Laguna Caucaya, 4 AM; 1948/6331, Cerro Itahuaticua, 810 m elevation, 1 MNK, 1 MSB; 1959/6318, 72 km ESE of Monteagudo, 5 FM; 2000/6300, Parapiti, 2 BM. **Tarija:** 2100/6323, 1 km S of Camatindi, 1 AM; 2119/6325, 8 km S and 10 km E of Villa Montes, 5 AM; 2126/6447, San Lorenzo, 1 ANSP; 2149/6334, Caiza, 2 (Thomas, 1898b); 2150/6333, 30 km NW of Yacuiba, 8 FM; 2210/6445, 118 km S of Tarija, 10 FM; 2213/6436, 4 km by road N of Cuyambuyo, at paper factory, 5 UMMZ; 2241/6426, río Lipeo, 9 ANSP. **Department uncertain:** 1 MSB.

Sturnira magna de la Torre, 1966

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Sturnira magna* was described by de la Torre (1966: 267), type locality Santa Cecilia, río Maniti, Iquitos, Peru.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Lingual cusps of anterior and middle lower molars (metaconid and entoconid) poorly defined, no vertical notches. Size fairly large (forearm length, 55–60 mm; condylobasal length, 24–26 mm)" (Koopman, 1994: 86). Measurements in tables 8 and 9 are of specimens from 35 km N of Caranavi (AM 246595–246598) and 47 km N of Caranavi (LSU 22708, 22863–22868).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 577.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonym used for Bolivian specimens is:

Sturnira magna: Webster and Jones, 1980: 3 (Tomonoco). Anderson et al., 1982: 6. Webster and Fugler, 1984: 17 (Tomonoco). Anderson, 1985b: 7 (name in list). Tamsitt and Hauser, 1985: 2 (four localities in La Paz, general information on species). Tamsitt and Valdivieso, 1986: 747 (four localities in La Paz). Ibáñez, 1985: 330 (1707/6544). Anderson, 1993: 23 (general distributional records).

LOCALITIES (7) AND SPECIMENS (20): **Cochabamba:** 1706/6529, Palmar, 1 MACN (R. M. Barquez, personal commun.); 1706/6533, El Palmar, río Cochi Mayu, 1 CBF; 1707/6544, El Sillar, or Puerto del Sillario, 1 EBD. **La Paz:** 1517/6737, 20 km by river N Puerto Linares, 1 LSU; 1529/6731, Tomon-

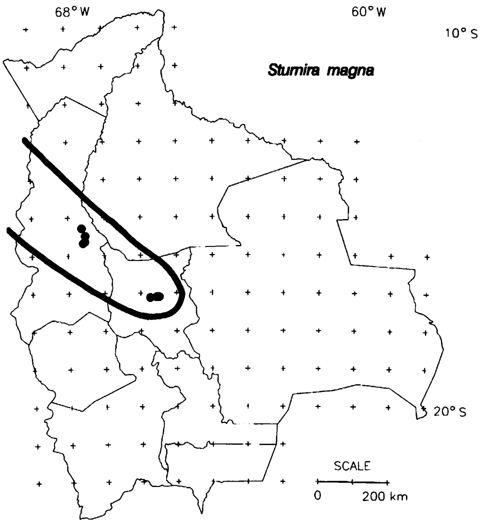


Fig. 577. Localities of known occurrence of *Sturnira magna.*

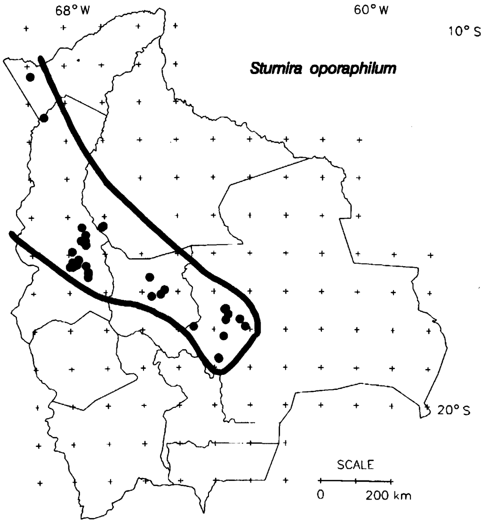


Fig. 578. Localities of known occurrence of *Sturnira oporaphilum.*

oco, 1 mi [= 1.6 km] W of Puerto Linares, 1 TTU; 1538/6732, 47 km by road N of Caranavi, in Serranía Bellavista, 7 LSU; 1540/6735, 35–37 km by road N of Caranavi, in Serranía Bellavista, 4 AM, 4 LSU.

Sturnira oporaphilum (Tschudi), 1844

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Phyllostoma oporaphilum* was described by Tschudi (1844: 64), type locality Peru. Koopman (*in* Wilson and Reeder, 1993: 192) used the name *Sturnira bogotensis* but opined that the correct name is probably *oporaphilum.* Pacheco and Patterson (1992: 60) recognized both *S. oporaphilum* and *S. bogotensis* and restricted the latter to a range from western coastal Peru north in the Andes to Colombia.

Morphological Characters and Comparisons: "Lingual cusps of anterior and middle lower molars (metaconid and entoconid) poorly defined, no vertical notches. Size medium (forearm length, 44–48 mm; condylobasal length, 21–22 mm). Inner upper incisors pointed, their tips not in contact" (Koopman, 1994: 85). Measurements in tables 8 and 9 are of specimens from 35 km N of Caranavi (AM 246554–246561, 246565) and 47 km N of Caranavi (LSU 22710).

Distributional Notes: Known localities are listed below and mapped in figure 578.

No Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: Two females with single embryos were taken in August and October. Nonpregnant females were taken in March (1), May (2), July (3), and September (1).

Scientific synonyms used for Bolivian specimens are:

Sturnira oporaphilum: Anderson et al., 1982: 6. Anderson and Webster, 1983: 2 (río Nareuda). Webster and Fugler, 1984: 17 (Tomonoco, Serranía Bella Vista, Sacramento Alto). Anderson, 1985b: 7 (name in list). Ibáñez, 1985: 330 (1707/6544). Anderson, 1993: 23 (general distributional records). Anderson et al., 1993: 23 (vicinity of Santa Cruz de la Sierra).

Sturnira ludovici ludovici: Webster and Jones, 1980: 3 (probable misidentification of 9 specimens from three localities in La Paz).

Sturnira bogotensis: Eisenberg, 1989: 147 (mentioned Bolivia as the southern limit of the range of *Sturnira bogotensis*, but see the note on taxonomy above).

Localities (38) and Specimens (310): **Beni:** 1515/6702, Serranía Pilón, 27 km by road N of río Quiquibay,2 AM; 1517/6704, Serranía de Pilón, 2 MSB. **Cochabamba:**

1637/6547, 50 km NW of Villa Tunari, at Puerto Patiño, 9 UMMZ; 1657/6522, 4 km SE of Villa Tunari, 1 UMMZ; 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 1 CBF; 1707/6544, El Sillar, or Puerto del Sillario, 3 EBD. **La Paz:** 1517/6737, 20 km by river N Puerto Linares, 1 LSU; 1529/6731, Tomonoco, 2 (Webster and Jones, 1980); 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 1 MSU, 1 TTU; 1538/6732, 47 km by road N of Caranavi, at Serranía Bellavista, 52 LSU; 1538/6739, 6.6 km downstream from Caranavi, in valley of río Coroico, 1 AM; 1540/6735, 37 km by road N of Caranavi, at Serranía Bellavista, 5 LSU; 1540/6735, 35 km by road N of Caranavi, at Serranía Bellavista, 9 AM, 2 LSU, 1 TTU; 1544/6731, La Reserva, 3 MSB; 1545/6731, 1 km S of La Reserva, 2 CBF; 1555/6754, 1.9 km downstream from Saenani, 2 AM; 1608/6744, Chijchipa, 6 IE; 1609/6744, Chijchijpa, 14 AM, 10 CBF, 5 MSB; 1612/6754, Sandillani, 2 EBD; 1616/6747, Sacramento Alto, 8 km by road N of Chuspipata, 4 MSU, 30 LSU, 2 TTU; 1618/6732, río Solocama, 14 km from Chulumani, 1 CBF; 1619/6753, río Aceramarca, 2 AM, 2 CBF, 2 MSB; 1619/6758, Mina Lourdes, 3800 m elevation, 2 AM, 1 MSB; 1628/6728, Irupana, 2 CBF; 1630/6728, 3 km S of Irupana, 7 AM; 1636/6729, Pasto Grande, 2 MNLP. **Pando:** 1117/6855, río Nareuda, 1 AM; 1223/6835, Chivé, 4 MNLP. **Santa Cruz:** 1727/6340, Buena Vista, 1 MACN; 1728/6342, 4 km SW of Buena Vista, 1 MSB; 1736/6336, San Rafael de Amboró, 37 AM, 8 MSB, 4 MNLP; 1744/6317, 8 km W of Santa Cruz, 2 MSB; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 19 AM, 8 MSB; 1755/6308, 15 km S of Santa Cruz, 2 MSB; 1755/6434, 1 km N and 8 km W of Comarapa, 1 AM; 1811/6344, 1 km NE Estancia Cuevas, 2 AM, 1 MNK, 2 MSB; 1845/6353, 14.5 km by road NW Masicuri, 1 AM; 1846/6352, 13 km by road NW of Masicuri, province of Vallegrande, 8 AM.

Sturnira tildae de la Torre, 1959

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Sturnira tildae* was described by de la Torre (1959: 1), type locality "Arima Valley, Trinidad," Trinidad and Tobago.

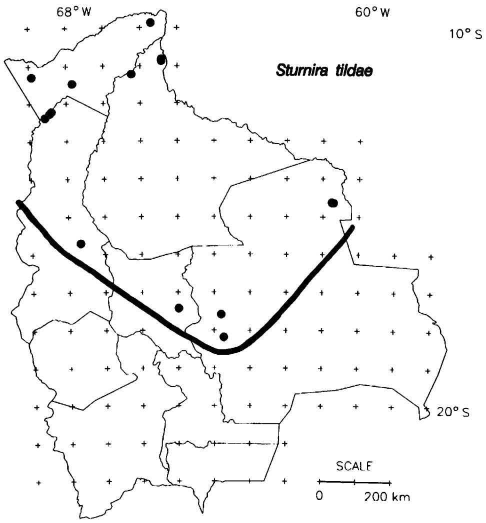


Fig. 579. Localities of known occurrence of *Sturnira tildae*.

Morphological Characters and Comparisons: "Lingual cusps of anterior and middle lower molars (metaconid and entoconid) fairly well defined by shallow vertical notches. Size medium (forearm length, 43–48 mm; condylobasal length, 20–23 mm). Inner upper incisors bilobed, the lobes of equal size with a broad cutting edge. Zygomatic breadth of skull wide (13.7–14.7 mm)" (Koopman, 1994: 85). Measurements in tables 8 and 9 are of specimens from Guayaramarin (AM 209408–209409), 5 km S of Guayaramarin 209419), and the río Nareuda (AM 248835–248839, 248841–248849).

Distributional Notes: Known localities are listed below and mapped in figure 579.

No Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: One female with prominent nipples was taken in May.

Scientific synonym used for Bolivian specimens is:

Sturnira tildae: Anderson et al., 1982: 6. Anderson and Webster, 1983: 2 (río Nareuda, Tumichucua). Webster and Fugler, 1984: 17 (Tumi Chucua). Anderson, 1985b: 7 (name in list). Emmons and Smith, 1992 (0952/6542). Anderson, 1993: 23 (general distributional records).

Anderson et al., 1993: 23 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (16) AND SPECIMENS (42): **Beni:** 1049/6525, Guayaramarin, 2 AM; 1052/6525, 5 km S of Guayaramarin, 1 AM; 1113/6614, Tumichucua, 1 LSU. **Cochabamba:** 1725/6459, río Jarimayo, 1 IML. **La Paz:** 1542/6740, Alcoche, 1 FM. **Pando:** 0952/6542, main camp on río Negro, 1 CBF (Emmons and Smith, 1992); 1117/6855, río Nareuda, 22 AM; 1128/6750, 15 km NO de [= NW of] Puerto Camacho, 1 CBF; 1213/6824, Santa Rosa, 1 AM; 1216/6827, 8 km SO de [= SW of] Santa Rosa, 1 CBF; 1223/6835, Chivé, 2 MNLP. **Santa Cruz:** 1437/6045, 23 km S of Los Fierros, 1 MNK; 1438/6042, El Encanto, 2 CBF; 1438/6044, 27.5 km S of Campamento Los Fierros, 1 MSB; 1735/6348, río Saguayo, Amboró, 1 MNK; 1811/6344, 1 km NE Estancia Cuevas, 3 AM.

Sturnira, species not determined

LOCALITIES (9) AND SPECIMENS (19): **Cochabamba:** 1635/6645, río Coacajes, Saque Rancho, 2 CBF (*lilium* or *oporaphilum*). **La Paz:** 1608/6744, Chijchijpa, 2 CBF (*lilium* or *oporaphilum*). **Santa Cruz:** 1725/6311, 10 km S of Montero, 5 MSB; 1727/6340, Buena Vista, 1 MACN (not examined); 1728/6341, 4 km SW of Buena Vista, 1 MSB; 1733/6332, 2 km S of Caranda, 1 MSB; 1824/6419, 7 km by road SE of Ariruma, 2 AM; coordinates unknown, Santa Cruz only, 1 MACN (not examined). **Tarija:** 2155/6319, 40 km E of Yacuiba, Gran Chaco, 2 CBF (*lilium* or *oporaphilum*). **Department unknown:** coordinates unknown, Bolivia only, 2 MACN (not examined).

Genus *Uroderma* Peters, 1865c: 588

The term "tent-making bat" has been used for members of the genus. However, members of some other genera are known to make tents also by cutting veins on leaves so they droop in tentlike form. Both of the known living species of *Uroderma* occur in Bolivia.

Dental formula i2/2, c1/1, p2/2, m3/3, total 32. "Rostrum approximately three quarters as long as braincase, not inflated, and without a deep depression or long nasal emargination. Interpterygoid space not extended by a deep palatal emargination. Inner upper incisors not elongate, less than twice length of outer upper incisors and deeply bifid. Forehead not markedly concave" (Koopman, 1994: 86).

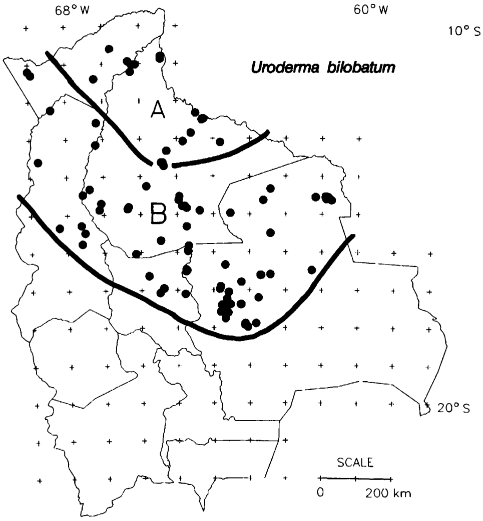


Fig. 580. Localities of known occurrence of two subspecies of *Uroderma bilobatum*, *U. b. bilobatum* (A) and *U. b. thomasi* (B).

Uroderma bilobatum Peters, 1866

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Uroderma bilobatum* was described by Peters (1866b: 394), syntypes from Cayenne and São Paulo [Brazil]. The specimen from São Paulo was referred to as "the type" by Andersen (1908: 220), the first reviser of the genus.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Ear pinna with a yellowish edging. Facial stripes well developed. Rostrum relatively shallow. Mesethmoid strap-shaped in frontal view and rodlike in cross section. Forearm length, 38–46 mm; condylobasal length, 19–23 mm" (Koopman, 1994: 86).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 580.

No Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Two pregnant females of *U. b. thomasi* with single embryos were taken in August (3) and September (2). Nonpregnant females were recorded in May (4), June (2), July (3), and August (1).

Scientific synonyms used for Bolivian specimens are given under the subspecies.

Uroderma bilobatum bilobatum Peters, 1866

Uroderma bilobatum bilobatum: Davis, 1968: 689 (five localities in Beni). Anderson et al., 1982: 6. Anderson and Webster, 1983: 3 (río Nareuda, Tumichucua). Anderson, 1985b: 7 (name in list). Baker and Clark, 1987: 1 (general information, mapped in Bolivia). Anderson, 1993: 23 (general distributional records).

Uroderma bilobatum: Emmons and Smith, 1992 (Centro Dieciocho).

LOCALITIES (20) AND SPECIMENS (76): **Beni:** 1048/6525, 1.5 km N of Guayaramarin, 1 AM; 1049/6525, Guayaramarin, 6 AM; 1052/6525, 5 km S of Guayaramarin, 6 AM; 1113/6614, Tumichucua, 9 LSU; 1219/6428, Puerto Acre, 1 AM; 1229/6415, 4 km above Costa Marques [Brazil], 6 AM; 1229/6417, bank of río Iténez across from Costa Marques, 9 AM; 1230/6418, mouth of río Baures, 4 AM; 1251/6436, La Esperanza, 1 FM; 1304/6449, San Joaquín, 3 FM; 1306/6348, Buenavista, 1 FM; 1319/6516, 7 mi [= 11.3 km] S of Exaltación, 1 AM; 1338/6523, opposite from mouth of río Yacuma, 1 AM; 1338/6525, río Yacuma, 2 km from mouth, 11 AM. **Pando:** 1036/6647, Centro Dieciocho, 3 CBF, 2 US (Emmons and Smith, 1992); 1056/6618, Remanso, 1 MSB; 1101/6606, W bank río Beni, opposite Hamburgo, 2 AM; 1101/6612, Agua Dulce, 1 AM; 1124/6713, La Cruz, 2 AM; 1213/6824, Santa Rosa, 3 AM, 2 MSB.

Measurements in tables 8 and 9 are of specimens from opposite Costa Marques (AM 209446, 209449–209452, 209454, 209456–209457, 209465) and 4 km above Costa Marques (AM 209472–209477).

Uroderma bilobatum thomasi Andersen, 1906

Uroderma Thomasi Andersen, 1906: 419 (type locality "Bellavista, Bolivia, 15^{S}., 6^{W}., 1400 m").

Uroderma thomasi: Andersen, 1908: 216, 221 (drawing of lower incisors and canines, Bellavista and Reyes).

Uroderma bilobatum thomasi: Sanborn, 1949: 281. Davis, 1968: 691. Anderson et al., 1982: 6. Webster and Fugler, 1984: 17 (Tomonoco, Caranavi). Anderson, 1985b: 7 (name in list). Baker and Clark, 1987: 1 (general information, mapped in Bolivia). Anderson, 1993: 23 (general distributional records). Anderson et al., 1993: 23 (vicinity of Santa Cruz de la Sierra).

Uroderma bilobatum: Sanborn, 1932: 177 (Buenavista). Barquez, 1977. Ojeda and Barquez, 1978: 37 (two from 7 km N of Santa Rosa). Ibáñez, 1985: 330 (1658/6349). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Ibáñez and Ochoa, 1989: 216 (38 km E of La Florida). Sawada and Harada, 1986: 369 (El Naranjal). Hinojosa *in* Estenssoro, 1992a (collected in Chimane region). Hinojosa 1992b (Serranía Eva Eva). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area).

Uroderma bilovatum: Sawada and Harada, 1986: 368 (a misspelling; from Hardeman).

Uroderma biloptum: Wilson and Salazar, 1990: 50 (a misspelling; cited specimen [from Totaisal] in Anderson-Yates collection).

LOCALITIES (77) AND SPECIMENS (298): **Beni:** 1343/6521, Puerto Caballo, 2 AM; 1415/6550, Venecia, 4 EBD; 1419/6723, Reyes, 1 BM (Davis, 1968); 1428/6734, Rurrenabaque, 1 IE; 1431/6456, río Mamoré, 1 AM; 1437/6457, mouth of río Ibare, 3 AM; 1442/6704, 45 km by road N of Yacuma, 1 AM; 1447/6447, Trinidad, 1 MSU; 1447/6451, Puerto Almacen, 1 AM; 1448/6619, Campamento El Trapiche, 1 IE, 1 MNLP; 1450/6444, 6 km by road SE of Trinidad, 1 AM; 1451/6621, Totaisal, 1 km SW of Estación Biológica del Beni, 1 MSB; 1451/6621, Florida, 2 EBD; 1452/6707, Km 35, NW of Yucumo, 1 AM; 1454/6422, 6 km W of Casarabe, 2 AM; 1519/6444, Camiaco, 1 AM; 1545/6523, Puerto San Lorenzo on río Sécure, 2 CBF; 1550/6441, 5 km NW of mouth of río Grande, 1 AM; coordinates unknown, TIPNIS, province of Moxos, 2 CBF; 1602/6610, Oromomo, 1 CBF. **Cochabamba:** 1557/6442, 2 km N of mouth of río Chapare, 1 AM; 1558/6442, mouth of río Chapare, 1 AM; 1627/6445, 51 km S of mouth of río Chapare, 1 AM; 1637/6547, 50 km NW of Villa Tunari, 6 UMMZ; 1657/6522, 4 km SE of Villa Tunari, 1 UMMZ; 1657/6523, Balneario Las Pozas, Villa Tunari, 2 EBD; 1657/6523, 2 km E of Villa Tunari, 3 AM; 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 1 MSB; 1706/

6447, Sajta, 1 CBF. **La Paz:** 1234/6710, Santa Ana de Madidi, 10 AM, 2 MSB; 1309/6712, río Beni, 1 AM; 1335/6846, Campamento Moira, 1 CBF; 1517/6737, 20 km by river N Puerto Linares, 8 LSU; 1520/6813, Bellavista, 1 BM (holotype); 1529/6731, Tomonoco, 1 mi [= 1.6 km] W Puerto Linares, 10 MSU, 11 TTU; 1546/6736, Caranavi, 34 MSU (7 not seen), 2 TTU. **Pando:** 1111/6900, El Naranjal, Nazaret, 1 (Sawada and Harada, 1986: 369); 1117/6855, río Nareuda, 5 AM. **Santa Cruz:** 1420/6225, Projecto río Negro-Blanco, 2 MNK; 1432/6053, Parque Nacional "Noel Kempff Mercado," 1 MNK; 1432/6054, Campamento Precámbrico, 3.5 km N of Los Fierros, 3 EBD; 1433/6049, 17 km S of Campamento Los Fierros, 2 MSB; 1433/6054, Camp "los Fierros," EBD 14420, 1 MNK, = 1436/6053, 38 km E of La Florida (Ibáñez and Ochoa, 1989); 1433/6110, 4 km E of Aserradero Moira, 4 EBD; 1433/6111, río Paragua, Aserradero Moira, 1 EBD; 1438/6044, 27.5 km S of Campamento Los Fierros, 1 AM; 1438/6237, Perseverencia, 1 MNK; 1530/6225, Puerto Almacen, 9 MNK; 1458/6332, Laguna Pajaral, 2 MNK; 1628/6116, Esperanza, near Concepción, 1 BM (subspecies uncertain); 1628/6444, 52 km S of mouth of río Chapare, 2 AM; 1630/6445, 56 km S of mouth of río Chapare, 1 AM; 1635/6225, San Ramón, Castedo, 1 MNK; 1636/6241, La Laguna, 1 EBD; 1636/6242, 10 km N of San Ramón, 2 MSB; 1647/6314, Estancia Cachuela Esperanza, 21 AM, 7 MSB; 1654/6348, La Ponderosa, Santa Rosa, 3 EBD; 1658/6349, 25 km NW of Santa Rosa de Sara (Ibáñez, 1985); 1703/6335, 7 km N of Santa Rosa, in province of Sara, 3 AM; 1712/6245, 1 km SE of Puerto Pacay, 1 MSB; 1714/6338, 4.5 km N of Buen Retiro, 2 AM; 1723/6314, 3 km SE Montero, 1 km N of Villa Copacabana, 1 AM, 2 MNK; 1723/6315, 3 km S of Montero, 1 AM, 2 MNK, 1 MSB; 1723/6332, San Miguel Rincón, 4 AM, 5 MSB; 1724/6344, 7 km N and 17 km W of Buenavista, 11 AM; 1724/6346, 25 km W of Buenavista, on west bank of río Yapacaní, 1 UMMZ; 1727/6340, Buenavista, 2 CM. 1734/6342, 3 km N and 13.5 km W of San Rafael de Amboró, río Saguayo, 1 AM; 1735/6348, río Saguayo, 2 MNK; 1736/6336, San Rafael de Amboró, 3 AM, 1 MSB; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 1 AM; 1753/6249, Lomas de Arena, 2 MNK; 1753/6307, Las Lomitas, 15 km S of Santa Cruz, 1 AM; 1755/6308, 15 km S of Santa Cruz, Las Lomitas, 2 MSB; 1755/6308, Palmasola, 1 CBF; 1758/6303, 27 km SE of Santa Cruz, 4 MSB; 1620/6340, Hardeman, 1 (Sawada and Harada, 1986: 368).

Measurements in tables 8 and 9 are of specimens from Estancia Cachuela Esperanza (AM 260190–260195, 260197–260200, 260210, MSB 55153–55155) and Santa Ana de Madidi (AM 261600–261603, 261612–261613, 261615–261618, MSB 57287, 56160).

Uroderma magnirostrum Davis, 1968

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Ear pinna without yellowish edging. Facial stripes poorly developed or absent. Rostrum relatively deep. Mesethmoid shield-shaped in frontal view and cross-shaped in cross section. Forearm length, 36–47 mm; condylobasal length, 20–22 mm" (Koopman, 1994: 86). Measurements in tables 8 and 9 are of specimens from Estancia Cachuela Esperanza (AM 260212–260216, 260080, 260083–260084, 260189) and the mouth of the río Baures (AM 209425–209428, 209430–209435, 209438, 209440).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 581.

HABITAT: The species was seen near Espíritu under a leaf of a banana plant some 2 m from the ground (Aguirre, 1994: 99).

HABITS AND BEHAVIOR: In a study of the time of activity at Espíritu, Beni (Aguirre, 1994: 89), the only specimen captured of this species was netted between 2400 and 0200 hours.

FOOD: No Bolivian data.

REPRODUCTION: Eight pregnant females with single embryos were taken in August (5) and September (3). One nonpregnant female was recorded in August. One female was carrying a young bat in April.

Scientific synonyms used for Bolivian specimens are:

Uroderma magnirostrum Davis, 1968: 679 (type locality 10 km E of San Lorenzo, Dept. de Valle, Honduras; five localities in Beni). Ibáñez,

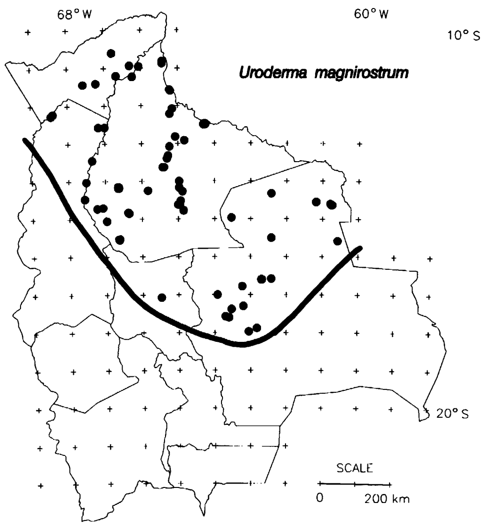


Fig. 581. Localities of known occurrence of *Uroderma magnirostrum*.

1981: 111 (map). Anderson et al., 1982: 7. Anderson and Webster, 1983: 3 (Tumichucua). Webster and Fugler, 1984: 17 (Tumichucua, Guayaramerin). Anderson, 1985b: 7 (name in list). Ibáñez, 1985: 330 (1636/6241). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Ibáñez and Ochoa, 1989: 216 (50 km E of La Florida). Emmons and Smith, 1992 (Centro Dieciocho). Anderson, 1993: 23 (general distributional records). Anderson et al., 1993: 24 (vicinity of Santa Cruz de la Sierra). Aguirre, 1994: 56 (Arroyo Carnaval near Espíritu).

Uroderma magnirostris: Wilson and Salazar, 1990: 50 (Estación Biológica del Beni).

LOCALITIES (69) AND SPECIMENS (192): **Beni:** 1049/6525, Guayaramarin, 4 AM, 2 (Webster and Fugler, 1984); 1052/6525, 5 km S of Guayaramarin, 2 AM; 1113/6614, Tumichucua, 3 LSU; 1134/6513, 5 km SW of Buena Hora [Brazil], 1 AM; 1136/6512, 6 km S of Buena Hora, 3 AM; 1205/6509, Alejandria, 1 AM; 1213/6513, Cascajal, 2 AM; 1229/6415, 4 km above Costa Marques [Brazil], on río Iténez, 2 AM; 1229/6417, left bank of río Iténez, opposite Costa Marques, 19 AM, 1 IML; 1230/6415, Pampa de Meio, 1 AM; 1230/6418, mouth of río Baures, 13 AM; 1249/6504, río Matucare near Puerto Siles, 1 AM; 1255/6449, Caravani, 1 FM; 1305/6514, río Mamoré on bank opposite of Navidad, 1 AM; 1319/6516, 7 km S of Exaltación, 2 AM; 1324/6518, 4 km SE of Palacios, 3 AM; 1327/6721, río Beni, 1 AM; 1338/6523, opposite the mouth of río Yacuma, 2 AM; 1338/6525, río Yacuma, 2 km from mouth, 1 AM; 1400/6458, río Mamoré, 1 AM; 1401/6731, río Beni, 1 AM; 1410/6640, Carnaval near Espíritu, 1 (Aguirre, 1994: 66); 1410/6458, río Tijamuchi, 4 km from mouth, 3 AM; 1415/6550, Venecia, 7 EBD; 1443/6714, 50 km N of Yacumo, on road to Rurrenabaque, 1 AM; 1428/6734, Rurrenabaque, 3 AM; 1431/6456, río Mamoré, 1 AM; 1416/6453, Puerto Leique, 1 AM; 1437/6457, mouth of río Ibare 1 AM; 1437/6500, 25 km NW of Trinidad, at río Mamoré, 1 AM; 1442/6704, 45 km N of Yacuma, 1 AM, 1 MSB; 1446/6451, 24 km above mouth río Ibare, 4 AM; 1447/6451, Puerto Almacen, 2 AM; 1450/6622, Los Tajibos, 40 km E of San Borja, 2 EBD; 1450/6623, río Curireba, 2 AM; 1451/6621, Estación Biológica del Beni, 1 AM; 1503/6658, 1 km E of La Embocada, Estancia La Cabaña, 3 UMMZ; 1536/6638, Sierra Eva Eva, 1 IE. **Cochabamba:** 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 1 AM. **La Paz:** 1234/6700, río Madidi, 8 km from mouth, 1 AM; 1234/6710, Santa Ana de Madidi, 1 AM, 4 MSB. **Pando:** 1036/6647, Centro Dieciocho (Emmons and Smith, 1992); 1056/6618, Remanso, 1 AM; 1057/6603, left bank of río Beni, 1 AM; 1112/6640, left bank río Madre de Dios, 1 AM, 2 MSB; 1124/6713, La Cruz, 1 AM; 1126/6734, Independencia, 3 AM, 1 MSB; 1213/6824, Santa Rosa, 1 AM; 1216/6827, 8 km SW of Santa Rosa, 1 CBF. **Santa Cruz:** 1420/6225, Projecto río Negro-Blanco, 1 MNK; 1433/6111, río Paragua, Aserradero Moira, 2 EBD; 1433/6110, 4 km E of Aserradero Moira, 3 EBD; 1436/6047, 50 km E of La Florida (Ibáñez and Ochoa, 1989); 1438/6044, 55 km E of Aserradero Moira, 5 EBD; 1438/6045, 23 km S of Campamento Los Fierros, 1 MSB; 1458/6332, Laguna Pajaral, 2 MNK; 1530/6225, Puerto Almacen, 21 MNK, 1 Venice; 1535/6034, Flor de Oro, 1 MNK; 1635/6225, San Ramón, Castedo, 2 MNK; 1636/6241, La Laguna, 1 EBD; 1636/6242, 10 km N of San Ramón, 1 AM, 1 EBD; 1700/6355, Ayacucho, 2 AM; 1734/6342, 3 km N and 13.5 km W of San Rafael de Amboró, río Saguayo, 2 AM; 1736/6336, San Rafael de Amboró, 5 AM, 2 MSB; 1647/6314, Estancia Cachuela Esperanza, 9 AM; 1718/6312, 2.5 km by road N and 8 km by road E of Montero, 1 AM; 1723/6332, San Miguel Rincón, 2 MSB; 1753/6249, Lomas de Arena, 1 MNK; 1758/6303, 27 km SE of Santa Cruz, 1 MSB.

Uroderma, species not determined

Specimens, 1. **Santa Cruz:** 1747/6310, Santa Cruz Zoo, 1 Hayward collection (not seen).

Genus *Vampyressa* Thomas, 1900

The term "yellow-eared bat" has been used for members of the genus. However, some members of other genera also have yellow ears. Dental formula i2/1–2, c1/1, p2/2, m2/2–3, total 26–30. "Rostrum approximately two thirds as long as braincase, not inflated, and without a deep depression or long nasal emargination. Interpterygoid space not extended by a deep palatal emargination. Inner upper incisors elongate, usually more than twice length of outer upper incisors, not deeply bifid. Posterior lower premolar simple. Anterior lower molar without a postero-internal cusp. Lingual cusps of middle lower molar very large" (Koopman, 1994: 88). Two of five living species are known from Bolivia.

Vampyressa bidens (Dobson), 1878

Taxonomic Remarks: Sometimes placed in a genus or subgenus *Vampyriscus*. The name used for Bolivian specimens has its type locality outside of Bolivia. *Chiroderma bidens* was described by Dobson (1898: 535), type locality Santa Cruz, río Huallaga, in Loreto, Peru. Jones and Carter (1976: 24) used the name combination *Vampyressa bidens*.

Morphological Characters and Comparisons: "A single pair of lower incisors. Anterior lower premolars longer than high. Last lower molar present. A dorsal stripe present . . .. Size fairly large (forearm length, 35–40 mm; condylobasal length, 16–18 mm)" (Koopman, 1994: 89). Measurements in tables 8 and 9 are of specimens from Santa Ana de Madidi (AM 261625–261627, 261633, 261640, MSB 57288) and opposite Independencia (AM 262517).

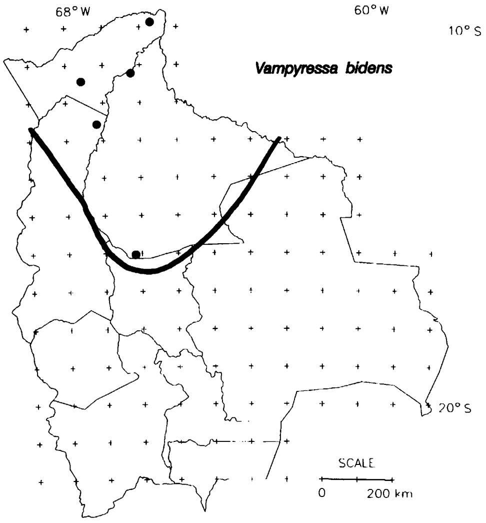


Fig. 582. Localities of known occurrence of *Vampyressa bidens*.

Distributional Notes: Known localities are listed below and mapped in figure 582.

No Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: One pregnant female with one embryo was taken in September.

Scientific synonyms used for Bolivian specimens are:

Vampyressa bidens: Webster and Fugler, 1984: 17 (Tumi Chucua). Anderson, 1985b: 7 (name in list); 1991: 142 (1234/6710 and 1126/6734) Emmons and Smith, 1992 (0952/6542). Anderson, 1993: 23 (general distributional records).

Vampyrops bidens: Anderson and Webster, 1983: 3 (Tumichucua).

Localities (5) and Specimens (11): **Beni:** 1113/6614, Tumichucua, 1 LSU; 1602/6610, Oromomo, 1 CBF. **La Paz:** 1234/6710, Santa Ana de Madidi, 5 AM, 1 MSB. **Pando:** 0952/6542, río Negro, 1 CBF + LHE 895; 1126/6734, right bank río Madre de Dios, opposite Independencia, 1 AM.

Vampyressa pusilla (Wagner), 1843

Taxonomic Remarks: If *Vampyressa bidens* is placed in a subgenus *Vampyriscus*, then the subgenus *Vampyressa* may be used for *V. pusilla*. Some names used for Bolivian

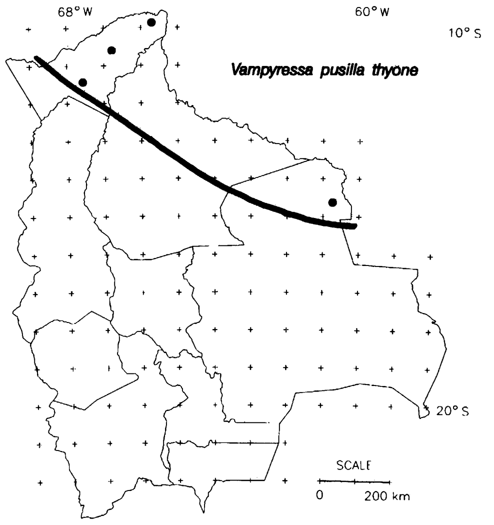


Fig. 583. Localities of known occurrence of *Vampyressa pusilla thyone*.

specimens have type localities outside of Bolivia. *Phyllostoma pusillum* was named by Wagner (1843: 173); type locality Sapitiba, Rio de Janeiro, Brazil. *Vampyressa thyone* was described by Thomas (1909: 231), type locality "Chimbo, near Guayaquil, Ecuador. Alt. 1000'." The source of the name *thyone* was not given in the original description.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Two pairs of lower incisors. Anterior lower premolar at least as high as long. No dorsal stripe . . .. Last lower molar absent. Size relatively small (forearm length, 29–32 mm; condylobasal length, 15–17 mm)" (Koopman, 1994: 88). Measurements in tables 8 and 9 are of these specimens (AM 262524, 262559).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 583.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Vampyressa pusilla thyone Thomas, 1909

Vampyrops pusilla: Lewis and Wilson, 1987: 1 (general information of the species).

Vampyressa pusilla: Eisenberg, 1989: 163 (undocumented mention of Bolivia). Emmons and Smith, 1992 (Centro Dieciocho, 0952/6542).

Vampyressa pusilla thyone: Anderson, 1991: 142 (1126/6734). Anderson, 1993: 23 (general distributional records).

LOCALITIES (4) AND SPECIMENS (8): **Pando:** 0952/6542, main camp on río Negro, 1 CBF (Emmons and Smith, 1992); 1046/6644, 18 km N of San Juan de Nuevo Mundo, 2 CBF, 2 US; 1126/6734, Independencia, 2 AM. **Santa Cruz:** 1438/6044, 27.5 km S of Campamento Los Fierros, 1 MNK.

Genus *Vampyrodes* Thomas, 1900

Dental formula i2/2, c1/1, p2/2, m2/3×2 = 30. "Rostrum approximately two thirds as long as braincase, not inflated, and without a deep depression or long nasal emargination. Interpterygoid space not extended by a deep palatal emargination. Inner upper incisors elongate, more than twice length of outer upper incisors, not deeply bifid. Posterior lower premolar tricuspidate. Anterior lower molar with a postero-internal cusp . . .. Size fairly large (forearm length, 46–54 mm; condylobasal length, 22–25 mm)" (Koopman, 1994: 88).

Vampyrodes caraccioli (Thomas), 1889

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Vampyrops Caraccioloe* was named by Thomas (1889: 167); type locality "Trinidad," Trinidad and Tobago. *Vampyrodes major* was described by G. M. Allen (1908: 38), type locality "San Pablo, Isthmus of Panama." The use of the subspecies *V. c. major* follows Handley (1966: 766) and Jones and Carter (1976: 24). The spelling *caraccioli* follows Thomas (1893a: 186), Carter and Dolan (1978: 55), and Honacki et al. (1982: 167).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 8 and 9 are of specimens from 20 km N of Puerto Linares (LSU 23361, 23412–23419) and the mouth of the río Curiche (AM 209518).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 584.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

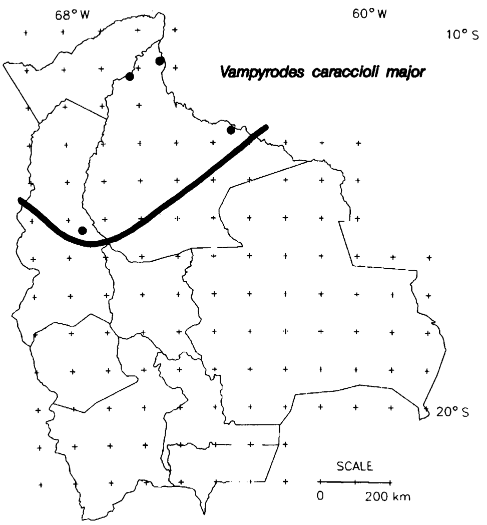


Fig. 584. Localities of known occurrence of *Vampyrodes caraccioli major.*

Vampyrodes caraccioli major G. M. Allen, 1908

Vampyrodes caraccioloi: Anderson et al., 1982: 8. Anderson, 1985b: 7 (name in list).
Vampyrodes caracioloi major: Anderson and Webster, 1983: 3 (Guayaramerin, Tumichucua). Webster and Fugler, 1984: 17 (Guayaramerin, Tumi Chucua).
Vampyrodes caraccioli; Emmons and Feer, 1990: 72 (mentioned Bolivia).
Vampyrodes caraccioloi major: Anderson, 1993: 24 (general distributional records).

LOCALITIES (4) AND SPECIMENS (21): **Beni:** 1049/6525, Guayaramerin, 2 LSU; 1113/6614, Tumichucua, 1 LSU; 1240/6330, mouth of the río Curiche, 1 AM. **La Paz:** 1517/6737, 20 km by river N Puerto Linares, 17 LSU.

SUBFAMILY DESMODONTINAE
BONAPARTE, 1845

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Anterior upper incisor and canine bladelike. Noseleaf reduced, upright portion absent or poorly developed. Tongue not [as in Glossophaginae] .... Single upper premolar in contact with canine and with anterior upper molar (which may be the only one). Zygomatic arch complete. Upper molars highly modified, reduced and blade-like or absent, no trace of a W-shaped ectoloph. All desmodontines are highly specialized for feeding on vertebrate blood" (Koopman, 1994: 94).

Genus *Desmodus* Wied-Neuwied, 1826

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Dental formula, i1/2, c1/1, p1/2, m1–2/1×2 = 20 or 22. "Ear pinna relatively long .... Legs and uropatagium sparsely haired. Coronoid process of mandible relatively high .... Lower incisors small, simple, and separate from one another" (Koopman, 1994: 94).

Desmodus rotundus (É. Geoffroy Saint-Hilaire), 1810

Common Vampire or Vampiro Comun

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Phyllostoma rotundum* was described by É. Geoffroy Saint-Hilaire (1810: 181); type locality restricted by Cabrera (1958: 93) to Asunción, Paraguay.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Only one upper molar. Postorbital constriction fairly well developed. Preorbital process absent. Pollex relatively long, its metacarpal with two pads. Calcar present but greatly reduced. Measurements in tables 8 and 9 are of specimens from Santa Ana de Madidi (AM 261771–261776) and Caracato (AM 248930–248970), in part.

DISTRIBUTIONAL NOTES: There are no specimens from Potosí, but Chacón (1892: 199) wrote that the vampire occurs in the provinces of Linares, Charcas, Chichas, and Cercado. Known localities are listed below and mapped in figure 585.

HABITAT: Roosting sites in hollow trees were reported near Espíritu, Beni (Aguirre, 1994: 97). We found a colony in the basement of an unoccupied house near Caracato (1659/6749) at 2900 m elevation and there are several other known localities above 2000 m.

HABITS AND BEHAVIOR: In a study during the 12 hours of darkness at Espíritu, Beni (Aguirre, 1994: 89), specimens were netted at various times between 2000 and 0600 hours, none between 1800 and 2000.

PARASITOLOGY AND DISEASE: Brennan

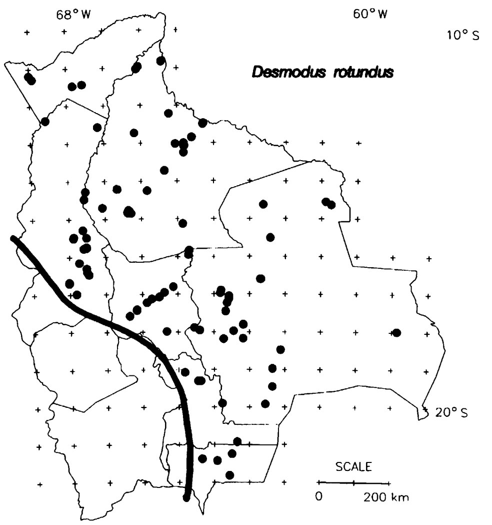


Fig. 585. Localities of known occurrence of *Desmodus rotundus*.

(1970: 811) reported two species of chiggers, *Hooperella vesperuginis* from 5 km S of Guayaramerin and *Perissopalla* nr. *barticonycteris* from Versalles. The rabies virus was found in one of eight *Desmodus rotundus* from near Sorata (1547/6840, in La Paz department, at 2500 m elevation; Stouraitis and Salvatierra, 1978: 101). The bats were identified by Roger M. Arnold. No voucher specimens were mentioned.

FOOD: These true vampires feed on blood.

REPRODUCTION: Pregnant females with single embryos were taken in April (8), May (1), July (1), and October (2).

Scientific synonyms used for Bolivian specimens are:

Edostoma cinerea d'Orbigny, 1834, plate 8 (from Santo-Corazón) [cited as 1835 by Sherborn and Griffin, 1934: 130, and by Hershkovitz, 1987b: 74; cited as 1836 by d'Orbigny and Gervais, 1847: 11]

Desmodus rufus: d'Orbigny and Gervais, 1847: 11 (Santo-Corazón). Gervais, 1855: 31 (Bolivia). Thomas, 1898b: 3 (from Caiza).

Desmodus rotundus: Thomas, 1902a: 126 (eight from Paratani). Sanborn, 1932a: 180 (Sara). Brennan, 1970: 811 (chiggers, 1049/6525, 1244/6610). Stouraitis and Salvatierra, 1978: 101 (rabies, Sorata). Ojeda and Barquez, 1978: 34 (7 km N of Santa Rosa). Anderson et al., 1982: 10. Anderson and Webster, 1983: 3 (río Nareuda, Caracato). Myers and Wetzel, 1983: 16 (Buenavista, Caiza). Anderson, 1985b: 8 (name in list). Ibáñez, 1985: 330 (1636/6241, 1658/6349, 1707/6544). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Sawada and Harada, 1986: 368 (Chivé and El Naranjal). Ibáñez and Ochoa, 1989: 219 (Espejillos). Ibáñez and Fernandez, 1989: 21 (Chiquitos). Wilson and Salazar, 1990: 52 (Estación Biológica del Beni). Mercado and Miralles, 1991: 295 (La Paz valley). Ergueta and Salazar, 1991: 13 (general summary). Anderson, 1993: 25 (general distributional records). Anderson et al., 1993: 27 (vicinity of Santa Cruz de la Sierra). Aguirre, 1994: 59 (five localities near Espíritu).

Desmodus rotundus rotundus: Greenhall et al., 1983b: 1 (recognized two subspecies). Webster and Fugler, 1984: 17 (Tomonoco, Caranavi).

LOCALITIES (95) AND SPECIMENS (392): **Beni:** 1049/6525, 5 km S of Guayaramarin, 7 AM; 1213/6513, Cascajal, on opposite bank of river from, 2 AM; 1229/6417, left bank of río Iténez, opposite Costa Marques [Brazil], 2 AM; 1230/6418, mouth of río Baures, 2 AM; 1244/6610, Versalles, 6 AM; 1251/6436, La Esperanza, 2 FM; 1300/6449, Aguadulce, 1 FM; 1301/6503, Providencia, 1 FM; 1304/6448, Camino Vilches, 3 FM; 1304/6449, San Joaquín, 5 FM; 1315/6449, Yutiole, 2 AM; 1343/6521, Puerto Caballo, 2 AM; 1410/6640, 1411/6638, 1413/6640, all near Espíritu, 12 (Aguirre, 1994: 66); 1415/6550, Venecia, 3 EBD; 1428/6734, Rurrenabaque, 14 AM; 1442/6704, 45 km N of Yacuma, 1 AM; 1446/6621, Campamento La Pascana, 1 MNLP; 1448/6619, Campamento El Trapiche, 1 AM, 1 MNLP; 1450/6622, Estancia Tajibos, or Los Tajibos, 4 EBD, 4 MNLP; 1450/6623, río Curiraba, 2 US; 1451/6617, río Matos, 6 km E of Estación Biológica del Beni, 1 MSB; 1451/6620, probably Estación Biológica del Beni, 1 CBF; 1451/6621, Totaisal, 1 km SW of Estación Biológica del Beni, 1 AM, 1 EBD, 1 MNLP; 1508/6451, 10 km E of San Antonio, 2 AM; 1550/6441, 5 km NW of mouth of río Grande, 1 AM; coordinates unknown, Arruda, 1 FM. **Chuquisaca:** 1904/6449, 12 km N and 11 km E of Tarabuco, 8 AM, 10 MNLP, 5 MSB; 1918/6422, 9 km by road N of Padilla, 1 MSB; 1918/6427, 16 km W of Padilla, 2500 m elevation, 2 AM; 1954/6346, 81 km from Ipati, pasado Mullu-Pampa, 2 EBD; 2056/6321, 2 km S and 10 km E of

Tiquipa, at Laguna Palmar, 1 AM. **Cochabamba:** 1530/6753, Chimosi, in the yungas, 2 US, 1 BM; 1557/6442, mouth of río Chapare, 2 km N of, 1 AM; 1648/6508, Todos Santos, 1 AM; 1657/6523, Balneario Las Pozas, Villa Tunari, 1 EBD; 1704/6531, 19 km SW of Villa Tunari, at San Rafael, 25 UMMZ; 1707/6544, El Sillar, or Puerto Sillar, 1 EBD; 1713/6552, Corani, 1 CBF, 1 MSB; 1724/6609, Cochabamba (assumed to be the city), 5 MACN (not examined); 1725/6609, Laguna Alalay, 5 EBD; 1734/6621, Parotani, 1 US, (plus 6 BM, 7 Thomas, 1902a); 1759/6519, 5 km S of Mizque, 10 UMMZ; coordinates unknown, Sehuenca, 3 MNK, 1 Venice. **La Paz:** 1234/6710, Santa Ana de Madidi, 7 AM, 2 MSB; 1416/6732, río Beni, 2 AM, 1 MSB; 1517/6737, Sararia, 2 UMMZ; 1528/6752, Guanay, 1 AM; 1529/6731, Tomonoco, 1 mi [= 1.6 km] W of Puerto Linares, 2 TTU; 1544/6731, La Reserva, 840 m elevation, 1 MSB; 1545/6731, 1 km S of La Reserva, 1 CBF; 1546/6736, Caranavi, 3 MSU, 2 TTU; 1609/6744, Chijchijpa, 1224 m elevation, 1 AMNH, 1 CBF; 1618/6732, río Solocame, 2 BM; 1624/6731, Chulumani, in the yungas, 6 BM, 4 US, 3 São Paulo, (Vanzolini, in litt.), 1 MACN (not examined); 1628/6728, Irupana, 1 IE; 1640/6801, Mecapaca, 2 AM; 1642/6801, Quebrada Capaña, 4 AM, 7 IE, 2 MNLP; 1659/6749, Caracato, 4 UMMZ, 42 AM. **Pando:** 1057/6603, left bank of río Beni, 1 AM; 1101/6606, W bank río Beni, opposite Hamburgo, 1 AM, 1 MSB; 1111/6900, El Naranjal, Nazaret, 2 (Sawada and Harada, 1986: 369); 1117/6855, río Nareuda, 2 AM; 1126/6734, Independencia, 4 AM, 2 MSB; 1128/6750, 15 km NO de [= NW of] Puerto Camacho, 1 CBF; 1223/6835, Chivé, 1 MNLP, 2 (Sawada and Harada, 1986: 369). **Santa Cruz:** 1433/6053, Los Fierros, 1 EBD; 1438/6044, 55 km E of Aserradero Moira, 1 EBD; 1438/6237, Perseverencia, 2 MNK; 1530/6225, Puerto Almacen, 5 MNK; 1636/6241, La Laguna, 3 EBD; 1636/6242, 10 km N of San Ramón, 1 AM; 1654/6348, La Ponderosa, 1 EBD; 1658/6349, 25 km NW of Santa Rosa de Sara (Ibáñez, 1985); 1703/6335, 7 km N of Santa Rosa, in province of Sara, 4 AM; 1707/6335, province of Sara, 6 CM; 1714/6338, 4.5 km N of Buen Retiro, 1 MSB; 1727/6340, Buenavista, 19 FM, 1 AM, 8 MACN (not examined); 1748/6310, Santa Cruz, 4 MACN (not examined); 1748/6311, El Cedrito, 1 MNK; 1753/6433, El Tunal, cantón Comarapa, 1 AM; 1757/6424, 6 km S and 10 km E of Comarapa, 1 AM; 1758/6327, Espejillos, 1 EBD; 1759/5851, Santo-Corazón, province of Chiquitos, (d'Orbigny and Gervais, 1847: 11); 1810/6311, 10 km E of Ingeniero Mora, 1 MSU (not seen); 1811/6344, 1 km NE Estancia Cuevas, 1 MNK; 1828/6207, 8 km SE of Tita, 3 AM; 1858/6221, San Antonio, Parapeti, 4 BM; 1927/6221, Cerro Colorado, 5 EBD (two not seen); 1955/6233, Perforación, 50 km S of Cerro Colorado, 2 EBD. **Tarija:** 2115/6330, Villa Montes, 8 Frankfurt (Felton, in litt.); 2123/6421, 25 km NW of Entre Ríos, 2 FM; 2149/6334, Caiza, 1 BM; 2126/6355, Tapecua, 1 MSB. **Department unknown:** coordinates unknown, Bolivia, 2 MACN.

Desmodus youngii Jentink, 1893

TAXONOMIC REMARKS: Koopman (*in* Wilson and Reeder, 1993: 194) used *Diaemus* Miller, 1906, for *D. youngii*. Among the three living species of vampires, if *D. youngii* and *D. rotundus* are regarded as more closely related phenetically and cladistically to each other than either is to *Diphylla ecaudata*, then the use of *Desmodus* for both *D. youngii* and *D. rotundus* stresses that relationship. In contrast, if a phenetic criterion for generic recognition is stressed and if the degree of difference between *D. youngii* and *D. rotundus* meets that criterion, then separate genera may be used. I prefer the former.

The name used for Bolivian specimens has its type locality outside of Bolivia. *Desmodus Youngii* was described by Jentink (1893: 282), type locality by implication "Berbice, New Amsterdam, British Guyana."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Pollex relatively short, its metacarpal with a single pad. Calcar absent. Two upper molars present. Postorbital constriction poorly developed. Preorbital process present. Measurements in tables 8 and 9 are of specimens from 4 km above Costa Marques, in Beni (AM 209742), 15 km above Horquilla, in Beni (AM 209744–209746), Independencia (AM 262644, 263182), and 4 km S and

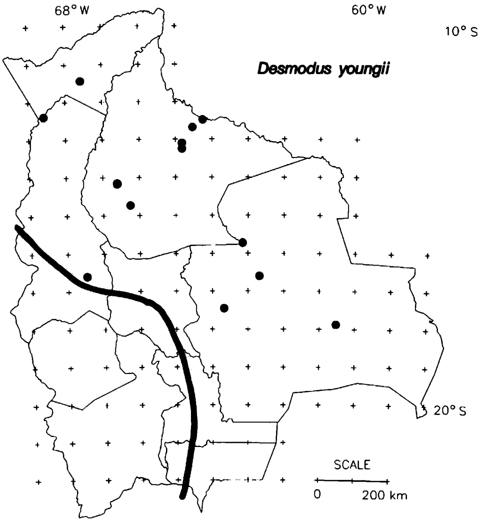


Fig. 586. Localities of known occurrence of *Desmodus youngii.*

24 km E of San José de Chiquitos (AM 260249, MSB 55177).

Distributional Notes: Known localities are listed below and mapped in figure 586.

Habitat: Known localities are below 500 m in elevation.

Habits and Behavior: Specimens (12) reported by Aguirre (1994: 60) near Espíritu, Beni, were collected with a shotgun when they came to feed on the blood of chickens in a corral. In a study during the first 6 hours of darkness at Espíritu, Beni (Aguirre, 1994: 89), one specimen was netted between 2000 and 2200 hours and another between 2200 and 2400.

Food: Feed on blood but no detailed Bolivian data.

Reproduction: No data.

Scientific synonyms used for Bolivian specimens are:

Diaemus youngii: Koopman, 1976: 46 (six in AM listed below). Barquez, 1984b: 67.

Desmodus youngi: Anderson et al., 1982: 10. Anderson, 1985b: 8 (name in list). Anderson, 1993: 25 (general distributional records). Anderson et al., 1993: 27 (vicinity of Santa Cruz de la Sierra). Aguirre, 1994: 59 (Espíritu).

Diaemus youngi: Ibáñez, 1985: 331 (1636/6241). Koopman, 1988: 13 (map). Koopman *in* Wilson and Reeder, 1993: 194.

Desmodus youngii: Sawada and Harada, 1986: 368 (Buena Vista).

Localities (13) and Specimens (20): **Beni:** 1229/6415, 4 km above Costa Marques, on río Iténez, 2 AM; 1241/6432, 15 km above Horquilla, on río Machupo, 3 AM; 1306/6449, 4 km S of San Joaquín, 1 FM; 1315/6449, Yutiole, 1 AM; 1413/6640, Espíritu, 2 (Aguirre, 1994: 66); 1444/6615, Campamento 08, 1 MNLP. **La Paz:** 1636/6729, Pasto Grande, 1 MNLP. **Pando:** 1126/6734, Independencia, 2 AM; 1223/6835, Chivé, 2 MNLP. **Santa Cruz:** 1543/6309, 6 km by road W of Ascención, 2 MSB; 1636/6241, La Laguna, 1 EBD; 1727/6340, Buenavista, 1 (Sawada and Harada, 1986: 368); 1752/6031, 4 km S and 24 km E of San José de Chiquitos, 1 AM, 1 MSB.

Diphylla Spix, 1823

Dental formula i2/2, c1/1, p1/2, m2/2, total 26. "Ear pinna relatively short. Pollex relatively short, its metacarpal without pads. Calcar small but well developed. Legs and uropatagium thickly haired. Coronoid process of mandible relatively low . . .. Lower incisors, large, complex, and forming a continuous cutting edge. Postorbital constriction virtually absent. Preorbital process absent" (Koopman, 1994: 94).

Diphylla ecaudata Spix, 1823

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Diphylla ecaudata* was described by Spix (1823: 68), type locality Rio So Francisco, Bahia, Brazil.

Morphological Characters and Comparisons: "Size fairly large (forearm length, 53–57 mm; condylobasal length, 19–21 mm)" (Koopman, 1994: 94). Measurements in tables 8 and 9 are of the specimen from Santa Ana de Madidi (AM 261777).

Distributional Notes: Known localities are listed below and mapped in figure 587.

No specific Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: The only Bolivian female, taken in September, had a single embryo (26 mm).

Scientific synonyms used for Bolivian specimens are:

Diphylla ecaudata: Eisenberg, 1989: 181 (undoc-

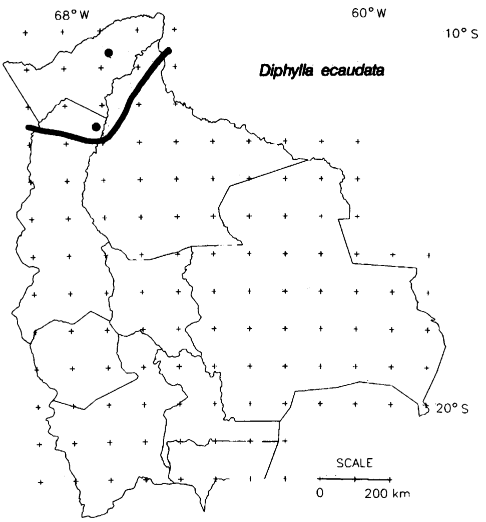


Fig. 587. Localities of known occurrence of *Diphylla ecaudata.*

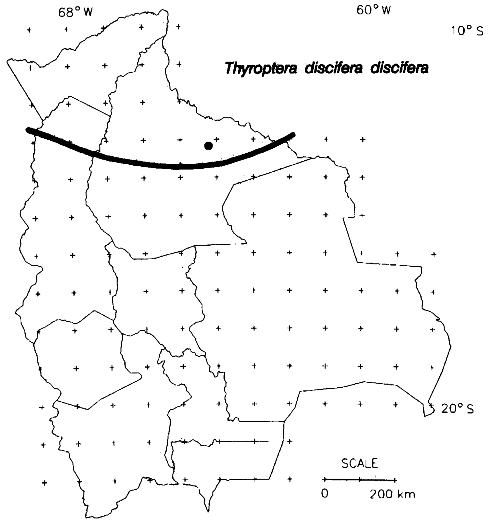


Fig. 588. Localities of known occurrence of *Thyroptera discifera discifera.*

umented mention of Bolivia). Emmons and Feer, 1990: 81 (undocumented mention of Bolivia). Anderson, 1991: 142 (first Bolivian record). Emmons and Smith, 1992 (Centro Dieciocho). Anderson, 1993: 25 (Santa Ana de Madidi).

Diphylla ecaudata ecaudata: Greenhall et al., 1984: 1 (general information on the species, recognition of subspecies).

LOCALITIES (2) AND SPECIMENS (2): **La Paz:** 1234/6710, Santa Ana de Madidi, 1 AM. **Pando:** 1036/6647, Centro Dieciocho, 1 CBF (Emmons and Smith, 1992).

FAMILY THYROPTERIDAE MILLER, 1907

These are termed the "disc-winged bats" or "murcielagos con mamantones." No vernacular name is in common use for individual species.

"Second digit of wing reduced to an incomplete metacarpal. Tail long, reaching slightly beyond extensive uropatagium. Trochiter large, articulating with scapula. First two thoracic vertebrae fused with one another but not with the last cervical. Rostrum not shortened. Ears large and funnel-shaped. Pollex with a large pedicillate suction disc (also a suction disc on the pes)" (Koopman, 1994: 96).

Genus *Thyroptera* Spix, 1823

Dental formula i2/3, c1/1, p3/3, m3/3, total 38. Three species are known, two occur in Bolivia. The third and largest species, *T. lavali*, recently described from Peru (Pine, 1993), may eventually be discovered also in Bolivia.

Thyroptera discifera
(Lichtenstein and Peters), 1855

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Hyonycteris discifera* was described by Lichtenstein and Peters (1855: 335), type locality Puerto Cabello, Carabobo, Venezuela.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Underparts brown. Calcar with a single cartilaginous projection .... Size relatively small (forearm length, 31–36 mm)" (Koopman, 1994: 96). Measurements in tables 8 and 9 are of a specimen from the rio Tapajoz in Brazil (AM 94549) and from the holotype (Wilson, 1978).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 588.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Thyroptera discifera discifera (Lichtenstein and Peters), 1855

Thyroptera discifera discifera: Wilson, 1978: 1 (general biology, use of name). Torres et al., 1988 (La Cayoba).

Thyroptera discifera: Anderson, 1993: 25 (general distributional records).

Localities (1) and Specimens (14): **Beni:** 1310/6413, La Cayoba, 14 Dept. de Cien. Nat., Univ. Nac. de Rio Cuarto (Torres et al., 1988).

Thyroptera tricolor Spix, 1823

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Thyroptera tricolor* was described by Spix (1823: 61); type locality "ad littora fluminis Amazonicum," Brazil, restricted by Husson (1962: 204) to "the lower Amazon River below Santo Antônio Dolçá at the mouth of the Rio Içá."

Morphological Characters and Comparisons: "Underparts whitish. Calcar with two [or sometimes only one] cartilaginous projections . . .. Size relatively large (forearm length, 33–38 mm)" (Koopman, 1994: 96). Measurements in tables 8 and 9 are of specimens from Palmera in Ecuador (AM 67592) and from 1452/6707 in Bolivia (AM 264691).

Distributional Notes: Known localities are listed below and mapped in figure 589.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Thyroptera tricolor tricolor Spix, 1823

Thyroptera tricolor: Anderson, 1985b: 8 (name in list). Wilson and Salazar, 1990: 52 (Estación Biológica del Beni). Anderson, 1993: 25 (general distributional records).

Thyroptera tricolor tricolor: Wilson and Findley, 1977: 1 (general information on species). Anderson and Webster, 1983: 3 (Tumichucua). Webster and Fugler, 1984: 17 (Tumichucua).

Localities (6) and Specimens (18): **Beni:** 1113/6614, Tumichucua, 5 LSU; 1448/6619, 500 m E of Campamento El Trapiche, 1 MNLP; 1450/6623, río Curirabe, 1 MNLP, 4 US; 1451/6621, Estación Biológica del Beni, 1 MNLP, 4 US (Wilson and Salazar, 1990: 52); 1452/6707, Km 35, NW of Yucumo, 1 AMNH. **La Paz:** 1609/6744, Chijchijpa, 1224 m, 1 MSB.

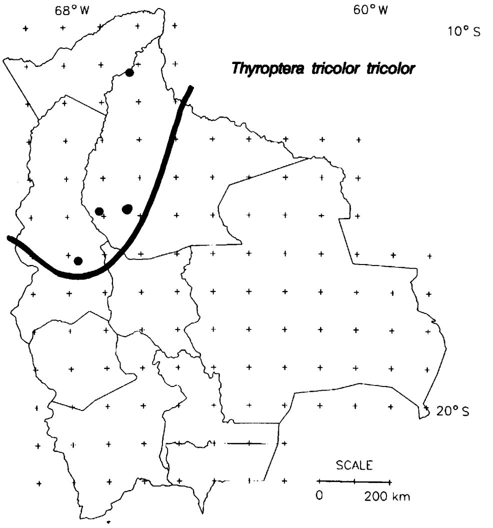


Fig. 589. Localities of known occurrence of *Thyroptera tricolor tricolor*.

FAMILY VESPERTILIONIDAE

These are bats of small to moderate size (at least in Bolivia) and with unelaborate facial features. The tail is long and extends through a wide, interfemoral membrane to its edge. There is a gap between teeth at the front of the upper jaws. The diet is insectivorous, the teeth are relatively numerous, and the molariform teeth are complex, not showing the reductions or specializations found in many bats that are not largely insectivorous.

"Second digit of wing reduced to the metacarpal and a single small phalanx. Tail long, reaching edge of extensive uropatagium. Trochiter large, making an extensive articulation with the scapula. Last cervical vertebra may be fused with first thoracic, but vertebrae otherwise unmodified . . .. The premaxillaries lack palatal branches and are usually widely separated from one another. The ears vary from being very long to very short and may or may not be funnel-shaped. Pollex unmodified" (Koopman, 1994: 97).

Among Bolivian vespertilionids, the number of teeth ranges from 38 in *Myotis* to 30 in *Lasiurus ega* and *Rhogeessa tumida*. The absent teeth, which show various degrees of reduction in other species, are the outer upper incisors, the middle premolar above and below, and the upper front premolar. The basic dental formula is i2/3, c1/1, p3/3, m3/3, total 38.

All Bolivian vespertilionids are of the subfamily Vespertilioninae.

Genus *Eptesicus* Rafinesque, 1820

The term Big Brown Bats is used for some members of the genus, even though not all are large. A species that may occur in Bolivia, in addition to those treated below, is *Eptesicus diminutus*. It is known from Argentina just south of Bolivia (Barquez et al., 1993: 57), and Williams (1978) mapped its postulated range as including most of eastern Bolivia. It may be discovered there eventually. It will be recognizable by its smaller size (forearm 32 to 35 mm).

TAXONOMIC REMARKS: Davis (1966: 256) in his revision of *Eptesicus* in South America, recognized *E. andinus* as a species separate from *E. brasiliensis*, and *Eptesicus montosus* as separate from *E. furinalis*.

Dental formula i2/3, c1/1, p1/2, m3/3, total 32. "Ear pinna not greatly enlarged. Braincase neither markedly deepened nor markedly flattened. Upper canine without a supplemental cusp. Outer upper incisor usually small and lateral to inner upper incisor. Rostrum not greatly broadened. Nasal and anterior palatal emarginations not greatly enlarged. Baculum triangular" (Koopman, 1994: 119).

Eptesicus andinus Allen, 1914

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Eptesicus andinus* was described by J. A. Allen (1914a: 382), type locality "Valle de las Papas (alt. 10,000 ft.), Central Andes, Huila, Colombia." Davis (1966: 256), in his revision of *Eptesicus* in South America, recognized *E. andinus* as a species separate from *E. brasiliensis*. Ochoa et al. (1993: 396) have reported sympatric samples of *E. andinus* and *E. brasiliensis* in Venezuela and treated them as separate species. The former is larger, has longer hair and blacker color. Davis also described *E. brasiliensis thomasi* from the upper Amazon, with specimens from Brazil, Ecuador, and Peru and mapped its range as extending south to northern Bolivia, but without any specimen from within 500 km of Bolivia. With only three Bolivian specimens identified as *E. andinus*, their specific status must be regarded as uncertain.

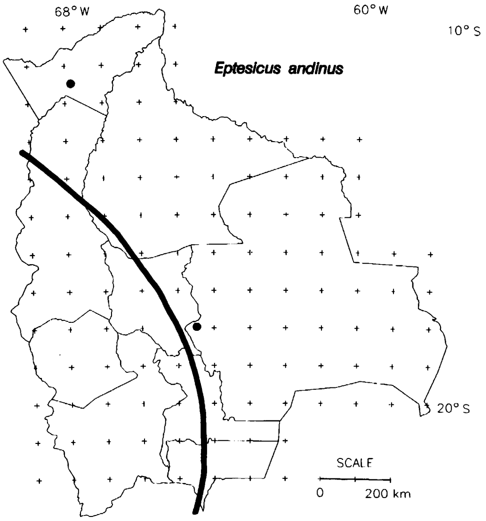


Fig. 590. Localities of known occurrence of *Eptesicus andinus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Rostrum of medium length and width, rounded to slightly flattened dorsally. Last upper molar usually not reduced. Braincase fairly high. Size medium (forearm length, 39–47 mm)" (Koopman, 1994: 120). Measurements in tables 8 and 9 are of specimen AM 260257.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 590.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonym used for Bolivian specimens is:

Eptesicus brasiliensis andinus: Anderson, 1991: 143 (first Bolivian record). Anderson, 1993: 25 (general distributional records).

LOCALITIES (2) AND SPECIMENS (3): **Pando:** 1128/6750, 15 km NO de [= NW of] Puerto Camacho, 2 CBF. **Santa Cruz:** 1758/6429, 5 km by road SE of Comarapa, 1 AM.

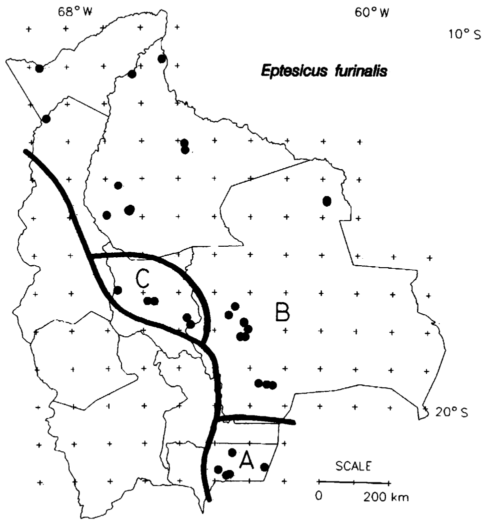


Fig. 591. Localities of known occurrence of three subspecies of *Eptesicus furinalis*, *E. f. furinalis* (A), *E. f. chapmani* (B), and *E. f. montosus* (C).

Eptesicus furinalis (d'Orbigny), 1847

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Vespertilio furinalis* was described by d'Orbigny (1847: 13), type locality "habite la province de Corrientes (republique Argentine)". Davis (1966: 256) in his revision of *Eptesicus* in South America, recognized *Eptesicus montosus* as separate from *E. furinalis*. *Eptesicus chapmani* was described by Allen (1915c: 632), type locality "Lower Rio Solimoen" [Solimões] near Manaus, Amazonas, Brazil.

Morphological Characters and Comparisons: "Rostrum of medium length and fairly slender, rounded dorsally. Last upper molar not reduced. Braincase fairly high. Size medium (forearm length, 34–47 mm)" (Koopman, 1994: 120).

Distributional Notes: Known localities are listed below and mapped in figure 591.

Habitat: Roosting sites in hollow trees near Espíritu were reported by Aguirre (1994: 97). One site was shared with *Myotis simus*.

Habits and Behavior: In a study during the first 6 hours of darkness near Espíritu, Beni (Aguirre, 1994: 89), ten bats of this species were netted between the hours of 1800 and 2000 and five between 2000 and 2200.

Food: Five stomachs from Espíritu, Beni (Aguirre, 1994: 83) contained Orthoptera (Grillidae), Homoptera (Delphacidae), Coleoptera (of at least five families), Lepidoptera, Diptera (both Nematocera and Brachycera), Hymenoptera (Formicidae), and Arachnida. Ten of 12 measureable prey items were less than 10 mm in length.

Reproduction: A pregnant female in July had two embryos.

Scientific synonyms used for Bolivian specimens are given under the subspecies below.

Eptesicus furinalis chapmani
Allen, 1915

Eptesicus montosus: Sanborn, 1932a: 181 (Buenavista).

Eptesicus furinalis chapmani: Davis, 1966: 267 (Izozog, Buenavista). Williams, 1978: 366 (Buenavista). Anderson et al., 1982: 10. Anderson and Webster, 1983: 3 (Tumichucua). Webster and Fugler, 1984: 17 (Tumi Chucua). Anderson, 1985b: 8 (name in list). Anderson, 1993: 25 (general distributional records). Anderson et al., 1993: 28 (vicinity of Santa Cruz de la Sierra).

Eptesicus furinalis furinalis: Myers and Wetzel, 1983: 22 (Santa Cruz).

Eptesicus sp.: Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni; presumably refers to this species).

Eptesicus furinalis: Ibáñez and Ochoa, 1989: 219 (38 km E of La Florida, Guaripembi). Sawada and Harada, 1986: 368 (Cobija). Wilson and Salazar, 1990: 53 (Estación Biológica del Beni). Aguirre, 1994: 62 (three localities near Espíritu). Aguirre and Urioste, 1994: 74 (Espíritu).

Localities (26) and Specimens (104): **Beni:** 1049/6525, Guayaramarin, 1 AM; 1113/6614, Tumichucua, 8 LSU; 1304/6449, San Joaquín, 1 FM; 1315/6448, 20 km S of San Joaquín, 1 AM, 1 FM; 1411/6638, 1413/6639, three localities near Espíritu, 15 (Aguirre, 1994: 66); 1448/6619, Campamento El Trapiche, 1 MNLP; 1450/6622, Los Tajibos, 1 EBD; 1450/6623, río Curireba, 1 US; 1450/6623, 5 km N of Porvenir, Isla de Bosque, 2 MNLP; 1451/6621, Estación Biológica del Beni, 3 CBF; 1457/6659, entre la Embocada y San Borja, 1 IE. **Pando:** 1102/6844, Cobija, 14 (Sawada and Harada, 1986:

369; 23 specimens, Harada in litt.). **Pando:** 1223/6835, Isla Gargantua, 1 AM. **Santa Cruz:** 1433/6053, Los Fierros, 1 EBD (reported as 1436/6053, 38 km E of La Florida by Ibáñez and Ochoa, 1989); 1722/6325, Buenavista, province of Sara, 1 CM, 1 FM, 2 BM (Davis, 1966); 1736/6336, San Rafael de Amboró, 7 AM, 3 MSB; 1747/6310, zoo at Santa Cruz [netted on the grounds], 2 EBD; 1748/6310, Santa Cruz [de la Sierra], 1 AM, 5 MACN (tentatively, skins only), 2 TTU; 1758/6303, 27 km SE of Santa Cruz, 1 MSB; 1810/6308, 15 km E of Ingeniero Mora, 3 AM; 1810/6316, 1 km E of Ingeniero Mora, 10 MSU; 1924/6245, Izozog, 1 (BM, Davis, 1966); 1926/6231, Guirapembi, 4 EBD; 1927/6221, Cerro Colorado, 9 EBD.

Measurements in tables 8 and 9 are of specimens from San Rafael de Amboró (AM 261778–261781, 261783–261784), near Ingeniero Mora (MSU 30777–30786) and Buenavista (BM 16.12.4.21).

Eptesicus furinalis furinalis (d'Orbigny), 1847

Vesperugo (*Eptesicus*) *fuscus*: Thomas, 1898b: 2 (from Aguairenda Mission, Caiza, and San Francisco, all in Tarija; not examined, and of uncertain identity).

Eptesicus furinalis furinalis: Davis, 1966: 267 (Caiza). Anderson et al., 1982: 10. Anderson, 1985b: 8 (name in list). Anderson, 1993: 25 (general distributional records).

Eptesicus sp.: Thomas, 1925: 576 (Sierra Santa Rosa).

LOCALITIES (5) AND SPECIMENS (16): **Tarija:** 2115/6330, San Francisco, on the río Pilcomayo, 6 (Thomas, 1898b); 2138/6234, Estancia Bolívar, 1 AM; 2142/6354, Sierra Santa Rosa, 1 BM (Thomas, 1925); 2149/6334, Caiza, 6 (Thomas, 1898b; one of these also cited by Davis, 1966); 2151/6340, Aguairenda Mission, Bolivian Chaco, 2 (Thomas, 1898b).

Eptesicus furinalis montosus Thomas, 1920

Vespertilio sp.: Thomas, 1902a: 126 (Choro).

Eptesicus montosus Thomas, 1920b: 363 (type locality "Choro, north of Cochabamba, Highlands of Bolivia, on the upper waters of the R. Mamore. Alt. 3600 m").

Eptesicus montosus montosus: Davis, 1966: 255 (Choro and Incachaca).

Eptesicus furinalis montosus: Koopman, 1978: 19 (implied that this trinomen should be used). Anderson et al., 1982: 10. Anderson, 1985b: 8 (name in list). Anderson, 1993: 25 (general distributional records).

Eptesicus furinalis: Myers and Wetzel, 1983: 21 (25 km by road W of Comarapa).

LOCALITIES (5) AND SPECIMENS (8): **Cochabamba:** 1656/6642, Choro, 1 BM (holotype); 1713/6552, Corani, 1 AM, 1 CBF, 1 MSB; 1714/6541, Incachaca, 2 (ANSP, Davis, 1966). **Santa Cruz:** 1740/6446, Calahuasi, 1 IML; 1751/6440, Comarapa, 25 km by road W of, in Siberia Cloud Forest, 1 UMMZ.

Measurements in tables 8 and 9 are of specimens from Incachaca (ANSP 19403, 19494), 25 km W of Comarapa (UM 155849), and Isla Gargantua (AM 262648).

Eptesicus, species not determined

LOCALITIES (2) AND SPECIMENS (6): **Santa Cruz**: 1748/6310, Santa Cruz de la Sierra, 5 MACN (not examined); 1750/6050, San José de los Chiquitos, 1 IML.

Genus *Histiotus* Gervais *in* Castelnau, 1855

The term "big-eared bat" is appropriate for *Histiotus*, although big ears are not unique to the genus.

TAXONOMIC REMARKS: The genus needs revision. Morphological and geographic limits of taxa are uncertain. Identifications must be regarded as tentative. For example, Koopman (*in* Wilson and Reeder, 1993: 205) listed *laephotis* as a synonym of *Histiotus macrotus* (Poeppig, 1835: 451), rather than *H. montanus*. I am uncertain which is correct. The Bolivian specimens of *Histiotus* are few and are scattered in five museums (in London, La Paz, New York, Paris, and Sevilla) and I have not assembled them in one place for comparison nor reexamined them recently.

Dental formula i2/3, c1/1, p1/2, m3/3, total 32. "Ears greatly enlarged and united by a band connecting their posterior surfaces. Each auditory bulla considerably wider than the space between them. Upper canine without a supplemental cusp. Outer upper incisor

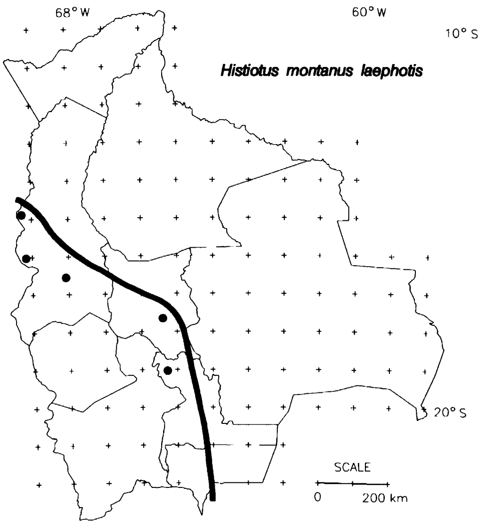


Fig. 592. Localities of known occurrence of *Histiotus montanus laephotis*.

small and lateral to inner upper incisor" (Koopman, 1994: 122).

Histiotus montanus (Philippi and Landbeck), 1861

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Vespertilio montanus* was described by Philippi and Landbeck (1861: 289), type locality "Cordillera von Santiago," Chile.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Ears relatively short and rounded. Connecting band poorly developed. Skull relatively broad. Forearm length, 44–51 mm" (Koopman, 1994: 122). Measurements in tables 8 and 9 are of specimens from Cota Cota (MNHN 505), Bolivia (BM 45.11.18.1), and Pocona (BM 34.9.2.20).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 592.

HABITAT: Occurs at high elevations, up to at least 4450 m at Ulla Ulla.

No Bolivian data are available on habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Histiotus montanus laephotis Thomas, 1916

Plecotus velatus: D'Orbigny and Gervais, 1847: 14 (town of Chuquisaca).

Histiotus velatus: Gervais *in* Castelnau, 1855: 77 (Bolivia). Hershkovitz, 1987b: 74 (Chuquisaca).

Histiotus macrotus: Peters, 1875: 788 ("Bolivia").

Vesperugo montanus: Dobson, 1878: 190 (skins of two adults from Bolivia). Lataste, 1891: 88 (Bolivia).

Histiotus laephotis Thomas, 1916c: 275 (type locality "Caiza," Tarija, Bolivia).

Histiotus macrotus laephotis: Anderson et al., 1982: 11.

Histiotus montanus laephotis: Anderson, 1985b: 8 (name in list). Anderson, 1993: 25 (general distributional records).

Histiotus montanus: Ibáñez, 1985: 331 (1452/6916). Mercado and Miralles, 1991: 295 (La Paz valley).

Histitous montanus: Miralles and Salazar, "1990": 6 (misspelling of name in list).

LOCALITIES (5) AND SPECIMENS (7): **Chuquisaca:** 1902/6517, Sucre, 1 (d'Orbigny and Gervais, 1847: 14, not seen, specific identification uncertain). **Cochabamba:** 1739/6524, Pocona, 1 BM. **La Paz:** 1452/6916, Reserva Ulla Ulla, 1 EBD (probably the specimen reported from "entre las lagunas Nuve y Cañuma" by Ibáñez, 1985); 1601/6910, Isla del Sol, 1 IE; 1633/6805, Cota Cota in La Paz, 1 MNLP. **Department unknown:** "Bolivia" only, 2 BM.

Histiotus velatus (I. Geoffroy Saint-Hilaire), 1824

TAXONOMIC REMARKS: See note under genus above. The name used for Bolivian specimens has its type locality outside of Bolivia. *Plecotus velatus* was described by I. Geoffroy Saint-Hilaire (1824: 446); type locality Curitiba, Paraná, Brazil.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Ears more or less triangular. Connecting band well developed. Skull relatively narrow. Forearm length, 45–49 mm" (Koopman, 1994: 122). Measurements in tables 8 and 9 are of specimens from Caiza (BM 97.1.25.4) and Irupana (MNLP 435).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 593.

HABITAT: This is one of the few Bolivian bats occurring at high elevations. Irupana, the highest, is at about 2100 m elevation.

No Bolivian data are available on habits, behavior, food, or reproduction.

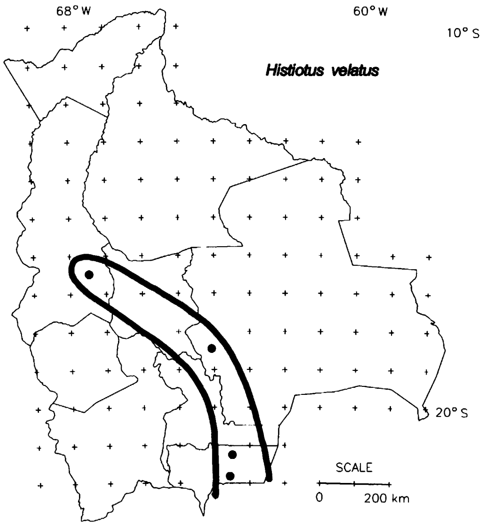


Fig. 593. Localities of known occurrence of *Histiotus velatus*. The boundary drawn is a minimum estimate. There are records from Paraguay and southwestern Brazil. If the identifications (Bolivian and otherwise) are correct, the range of the species within Bolivia may be somewhat greater than shown.

Scientific synonyms used for Bolivian specimens are:

Vesperugo (*Histiotus*) *velatus*: Thomas, 1898b: 2 (one from San Francisco Mission on the río Pilcomayo and nine from Caiza in the Bolivian Chaco).

Histiotus velatus: Anderson, 1993: 25 (general distributional records).

Localities (4) and Specimens (4): **La Paz:** 1629/6728, Irupana, 1 MNLP. **Santa Cruz:** 1827/6404, 5.5 km by road NNE of Vallegrande (río Cienega), 1 AM. **Tarija:** 2115/6330, San Francisco Mission (Thomas, 1898b); 2149/6334, Caiza, 1 BM (Thomas, 1898).

Genus *Lasiurus* Gray, 1831

Rostrum relatively short and deep. Dental formula, i1/3, c1/1, p1–2/2, m3/3, total 30 or 32. Uropatagium furred dorsally to various degrees. "Ear pinna at least somewhat shortened. Braincase high" (Koopman, 1994: 129).

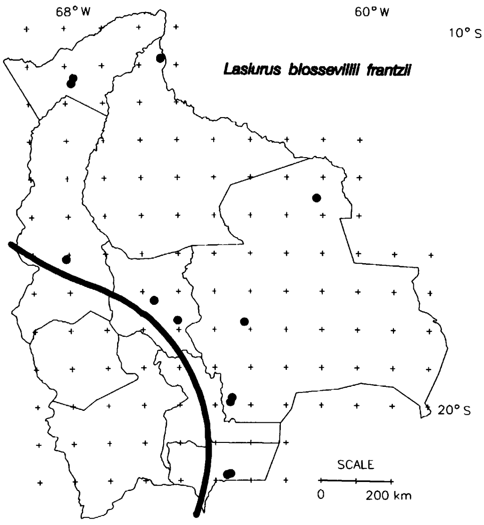


Fig. 594. Localities of known occurrence of *Lasiurus blossevillii frantzii*.

Lasiurus blossevillii
Lesson and Garnot, 1826
Red Bat or Murcielago Rojizo

Taxonomic Remarks: When *L. ega* is placed in a separate subgenus, *L. blossevillii* and *L. cinereus* are placed in the Subgenus *Lasiurus*.

The name used for Bolivian specimens has its type locality outside of Bolivia. *Vespertilo Blossevillii* was described by Lesson and Garnot (1826: 95), type locality "Monte-Video," usually cited as Montevideo, Uruguay, but Buenos Aires was suggested by Allen (1900a: 165).

Morphological Characters and Comparisons: Two upper premolars, size relatively small, color more or less reddish. Measurements in tables 8 and 9 are of specimens from 5 km S of Guayaramarin (AM 209773) and Incachaca (BM 34.9.2.19).

Distributional Notes: Known localities are listed below and mapped in figure 594.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Lasiurus blossevillii frantzii
(Thomas), 1898

Atalapha borealis frantzii: Thomas, 1898b: 2 (Aguairenda and Caiza).

Lasiurus borealis frantzii: Goldman, 1932: 148 (first use of name combination). Anderson et al., 1982: 11. Anderson, 1985b: 8 (name in list).

Lasiurus borealis blossevillii: Shump and Shump, 1982a: 3 (map, general information on species).

Lasiurus borealis: Myers and Wetzel, 1983: 23 (Caixa). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Wilson and Salazar, 1990: 53 (name in list for Estación Biológica del Beni). Koopman *in* Wilson and Reeder, 1993: 206 (regarded the separation of *borealis* and *blossevillii* as "premature").

Lasiurus blossevillii: Baker et al., 1988: 8 (Bolivia by inference). Anderson, 1993: 26 (general distributional records). Aguirre and Urioste, 1994: 74 (Arroyo Hermoso).

LOCALITIES (12) AND SPECIMENS (15): **Beni:** 1050/6525, 5 km S of Guayaramarin, 1 AM. **Cochabamba:** 1714/6541, Incachaca, 1 BM (not seen); 1745/6502, 17 km E of Totora, Tinkusiri, 1 CBF. **La Paz:** 1607/6805, 0.5 km E of Saynani, 1 AM. **Pando:** 1113/6742, Arroyo Hermoso, 2 (Aguirre and Urioste, 1994: 74); 1128/6750, 15 km NO de [= NW of] Puerto Camacho, 2 CBF. **Santa Cruz:** 1433/6110, 4 km E of Aserradero Moira, 1 EBD; 1748/6310, Santa Cruz [city], 1 MNK; 1948/6331, Cerro Itahuaticua, 1 MNK, 1 MSB; 1955/6334, 15 km [N of] Camiri, 1 EBD. **Tarija:** 2149/6334, Caiza, 1 (Thomas, 1898b); 2151/6340, Aguairenda, 1 (Thomas, 1898b).

Lasiurus cinereus
(Palisot de Beauvois), 1796

Hoary Bat or Murcielago Blancuzco

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Vespertilio cinereus* (misspelled *linereus*) was described by Palisot de Beauvois (1796: 18), type locality Philadelphia, Pennsylvania. *Vespertilio villosissimus* was described by É. Geoffroy Saint-Hilaire (1806: 204); type locality restricted to Asunción, Paraguay, by Cabrera (1958: 114). Thomas (1901g: 435) first used the name combination *Lasiurus cinereus villosissimus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Size relatively large. Two upper premolars present. Pelage grizzled, colorful. Measurements in tables 8 and 9 are of specimens from Cotapata (LSU 22703), 4.5 km N of Buen Retiro (MSB 55179, AM 260259), and 3 km SE of Comarapa 260258).

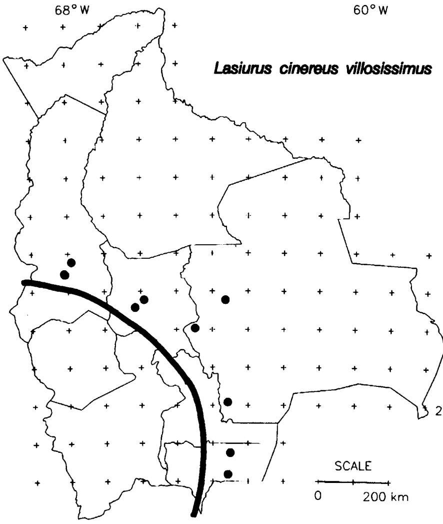


Fig. 595. Localities of known occurrence of *Lasiurus cinereus villosissimus*.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 595.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Lasiurus cinereus villosissimus
(É. Geoffroy Saint-Hilaire), 1806

Atalapha cinerea Var. a (*Atalapha grayi*): Dobson, 1878: 273 (Bolivia).

Atalapha cinerea: Thomas, 1898b: 2 (Caiza, San Francisco).

Lasiurus cinereus villosissimus: Sanborn and Crespo, 1957: 6 (Caiza). Anderson et al., 1982: 11. Myers and Wetzel, 1983: 23 (Villa Montes or San Francisco). Shump and Shump, 1982: 1 (general information on species). Anderson, 1985b: 8 (name in list). Anderson, 1993: 26 (general distributional records).

Lasiurus cinereus vellossisimus: Mercado and Miralles, 1991: 295 (a misspelling, La Paz valley).

Lasiurus cinereus: Ibáñez et al., 1994: 80 (first specimen from Cochabamba).

LOCALITIES (10) AND SPECIMENS (11): **Cochabamba:** 1713/6554, 13 km N of Colomi, 1 CBF; 1725/6609, Laguna Alalay, 1 EBD. **La Paz:** 1613/6754, Cotapata, 4.5 km by road WNW Chuspipata, 1 LSU; 1632/6806, Calacoto, 1 MNLP; 1633/6805, Cota Cota, 1 MSB. **Santa Cruz:** 1714/6338, 4.5 km N of Buen Retiro, 1 AM, 1 MSB; 1758/6429, 5 km by road SE of Comarapa, 1 AM; 1955/6334, 15 km [N of] Camiri, 1 EBD. **Tarija:** 2115/6330, San Francisco, 1 (BM, Thomas, 1898b); 2149/6334, Caiza, 1 (BM, Thomas, 1898).

Lasiurus ega (Gervais *in* Castelnau), 1855

Yellow Bat or Murcielago Leonado

TAXONOMIC REMARKS: Sometimes placed in a separate genus or subgenus *Dasypterus* Peters, 1871. The name used for Bolivian specimens has its type locality outside of Bolivia. *Nycticejus Ega* was described by Gervais *in* Castelnau (1855: 73), type locality "Éga, ville du Brésil," Amazonas, Brazil.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Size medium. Uropatagium furred only proximally. Pelage yellowish. Ear pinna not greatly shortened. Rostrum not greatly shortened. One upper premolar. Measurements in tables 8 and 9 are of specimens from San Joaquín (FM 115808–115813), Trinidad (MSU 30771), Sararia (UM 126695), mouth of the río Ibare (AM 211253), and Santa Cruz de la Sierra (AM 261785).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 596.

No Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: A young individual (cartilaginous epiphyses) was taken in February.

Scientific synonyms used for Bolivian specimens are:

Lasiurus ega ega (Gervais *in* Castelnau), 1855

Atalapha ega "subsp.": Sanborn, 1932a: 181 (Buenavista).

Lasiurus ega ega: Handley, 1960: 474 (first use of name combination, Buena Vista). Anderson et al., 1982: 11. Anderson and Webster, 1983: 3 (Tumichucua). Myers and Wetzel, 1983: 23 (Buenavista, Villa Montes, Caixa). Webster and Fugler, 1984: 18 (Tumi Chucua). Anderson et al., 1993: 28 (vicinity of Santa Cruz de la Sierra). Aguirre and Urioste, 1994: 74 (Arroyo Hermoso).

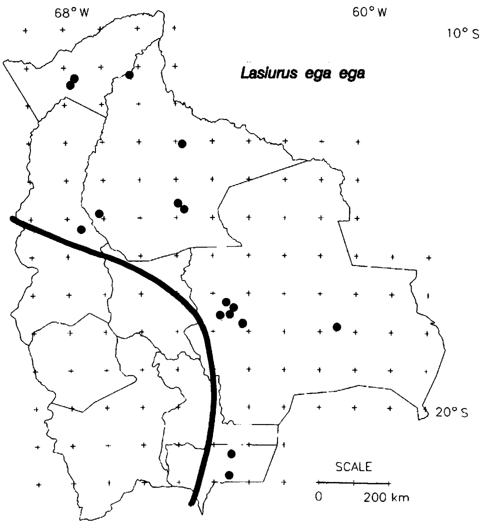


Fig. 596. Localities of known occurrence of *Lasiurus ega ega*.

Lasiurus ega: Anderson, 1985b: 8 (name in list). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Wilson and Salazar, 1990: 53 (name in list for Estación Biológica del Beni). Anderson, 1993: 26 (general distributional records).

Lasiurus (*Dasypterus*) *ega*: Koopman *in* Wilson and Reeder, 1993: 207 (use of subgenus).

LOCALITIES (19) AND SPECIMENS (38): **Beni:** 1113/6614, Tumichucua, 1 LSU, 4 (Webster and Fugler, 1984); 1304/6449, San Joaquín, 6 FM; 1437/6457, mouth of río Ibare, 1 AM; 1447/6447, Trinidad, 1 MSU (not seen); 1452/6707, Km 35, NW of Yucumo, 1 CBF. **La Paz:** coordinates unknown, río Medidi, 1 BM (not seen); 1517/6737, Sararia, 1 UMMZ. **Pando:** 1113/6742, Arroyo Hermoso, 1 (Aguirre and Urioste, 1994: 74); 1128/6750, 15 km NO [= NW] de Puerto Camacho, 1 CBF. **Santa Cruz:** 1714/6338, 4.5 km N of Buen Retiro, 1 AM; 1722/6325, Buenavista, province of Sara, 3 CM, 1 FM; coordinates unknown, Parque Amboró, 1 MNK; 1734/6348, río Saguayo, 1 MNK; 1733/6332, 2 km S of Caranda, 1 MSB; 1747/6310, Santa Cruz Zoo, 1 MNK; 1748/6310, Santa Cruz, 1 AM, 2 MSU (not seen); 1752/6031, 4 km S and 24 km E of San José de Chiquitos, 1 MSB. **Tarija:** 2115/6330, Villa Montes, 1 FM; 2149/6334, Caiza, 1 US, + 5 (Thomas, 1898b).

Genus *Myotis* Kaup, 1829

These are sometimes termed "little brown bats," a name more commonly used for the North American species *Myotis lucifugus*. Mouse-eared Bats might be a more suitable name; the word *Myotis* is based on Greek words for mouse and eared. Vernacular names for individual species in South America are not in common use. Bolivian species are assigned to two subgenera, *Leuconoe* and *Selysius*.

TAXONOMIC NOTES: The gender for nomenclatural purposes of the generic name *Myotis* has been argued by Woodman (1993) and Pritchard (1994). Woodman treated *Myotis* as feminine and would accordingly revise the spelling of the specific epithets *riparius* to *riparia*, *simus* to *sima*, and *oxyotus* to *oxyota* (considering only names pertinent to Bolivia). Pritchard treated *Myotis* as masculine. Many other authors have done this by implication, mostly by selecting masculine forms for specific epithets rather than explicitly stating the gender of the generic name. I do not find the chain of argument of either author to be overwhelmingly convincing; both involve some rather tenuous interpretations. My choice is to use the names as used in Wilson and Reeder (1994).

One Bolivian skull was referred to *Vespertilio chiloensis* by Gerrard (1862: 45). I have not seen the skull and no other specimens from Bolivia have been referred to this species. Thus, Gerrard's identification is unverified.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Dental formula usually i2/2, c1/1, p2/2, m3/3, total 38, but middle upper and lower premolars absent in a few species. "Hypocone on anterior and middle upper molars absent or poorly developed. Tragus of ear long and slender. Uropatagium nearly naked dorsally" (Koopman, 1994: 100).

Subgenus *Leuconoe* Boie, 1830

TAXONOMIC NOTES: Based on the Wasserfledermaus of Europe (= *Vespertilio daubentonii* Kuhl). Some authors have umlauted the final "e" in *Leuconoe*. However, the International Code of Zoological Nomenclature states that "No diacritical mark ,. . . is to be used in a scientific name" (Art. 27; International Commission on Zoological Nomenclature, 1985). "Anterior upper premolar usually in toothrow and not greatly reduced. Size fairly small [in Bolivian species] to relatively large. Maxillary tooth row relatively long. Margin of plagiopatagium tending to be attached well up on the ankle or lower leg, leaving the large foot free. Wings and legs usually relatively short and hairy. Keel on calcar usually poorly developed. Usually with strong development of accessory molar cusps" (Koopman, 1994: 105).

Myotis albescens (É. Geoffroy Saint-Hilaire, 1806)

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Vespertilio albescens* was described by É. Geoffroy Ssint-Hilaire (1806: 204), type locality "Paraguay" or "Estancia de Sn. Solano junto al Estero Ybera . . . en plena region Sur del Paraguay" (Morales Agacino, 1937: 18–19). The locality designation as quoted by Husson (1978: 173) was actually a paraphrasing of parts of two different paragraphs.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: *Myotis albescens* (according to LaVal, 1973: 26) is a "medium-sized *Myotis* with dark brown or black fur tipped with golden yellow or silvery white, and with a relatively wide postorbital constriction." The membranes are sparsely furred and fur does not reach knees on dorsal surface of uropatagium. A fringe of hair is usually present on posterior edge of uropatagium. Membranes are pale light brown to black. The skull is of moderate size with little forehead slope. The rostrum is relatively narrow (0.91 to 0.98 of postorbital breadth). The baculum is large. The foot tends to be larger than in *M. nigricans*. Also, in comparison with *M. nigricans*, *M. albescens* is said to have a less attenuated tragus (Husson, 1978: 51) in its upper fourth, being nearly the same width throughout and with indistinct basal lobe. Measurements in tables 8 and 9 are of specimens from Porvenir (MSB 56206, AM 261808), 27 km N of río Quiquibay (AM 261118), 1558/6442 (AM 211241—211242), 1702/6529 (AM 244640), 1117/6329 (AM 248974), and 1703/6335 (AM 246414).

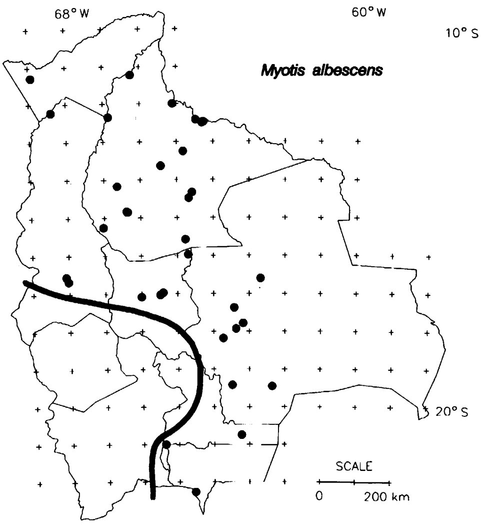


Fig. 597. Localities of known occurrence of *Myotis* (*Leuconoe*) *albescens*.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 597.

HABITAT: Roosting sites in buildings were reported by Aguirre (1994: 99) near Espíritu, Beni. Sites were shared with *Myotis nigricans*.

HABITS AND BEHAVIOR: In a study during the first 6 hours of darkness at Espíritu, Beni (Aguirre, 1994: 89), specimens of this species were netted in each 2-hour interval.

FOOD: The contents of one stomach reported by Aguirre (1994: 83) included remains of Lepidoptera and Arachnida.

REPRODUCTION: One lactating female was recorded in September. No other data.

Scientific synonyms used for Bolivian specimens are:

Myotis albescens: Miller and Allen, 1928: 200 (Rosario). LaVal, 1973: 27 (three localities in Beni). Anderson et al., 1982: 10. Anderson and Webster, 1983: 3 (río Nareuda, Tumichucua). Myers and Wetzel, 1983: 16 (8 km S and 10 km E of Villa Montes). Webster and Fugler, 1984: 18 (Tumi Chucua). Anderson, 1985b: 8 (name in list). Ibáñez, 1985: 331 (1636/6241). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Wilson and Salazar, 1990: 52 (Estación Biológica del Beni). Mercado and Miralles, 1991: 295 (La Paz valley). Anderson, 1993: 25 (general distributional records). Anderson et al., 1993: 27 (vicinity of Santa Cruz de la Sierra). Aguirre, 1994: 60 (two localities near Espíritu).

Myotis (*Leuconoe*) *albescens*: Koopman *in* Wilson and Reeder, 1993: 208.

LOCALITIES (36) AND SPECIMENS (282): **Beni:** 1113/6614, Tumichucua, 1 LSU; 1200/6506, Puerto Moré, 11 AM; 1221/6651, Rosario, 1 US; 1225/6428, left bank of río Iténez, opposite Principe da Beira [Brazil], 1 AM; 1229/6415, 4 km above Costa Marques, 2 AM; 1229/6417, left bank of río Iténez, opposite Costa Marques [Brazil], 1 AM; 1230/6418, mouth of río Baures, 1 AM; 1315/6449, 20 km S of San Joaquín, 5 AM; 1338/6526, río Yacuma, 4 km from mouth, 176 AM; 1410/6640, 1413/6640, both near Espíritu 12 (Aguirre, 1994: 66); 1420/6435, Santa Rosa, río Cucharra, 4 IML (not seen); 1429/6440, San Juan, 1 IML; 1450/6623, río Curirabu, 1 MNLP; 1451/6621, Estación Biológica del Beni, 4 AM, 1 IE, 1 MSB; 1451/6622, río Matos, 1 IE; 1515/6702, Serranía Pilón, 27 km by road N of río Quiquibay, 1 AM; 1534/6446, 15 km S of Limoquije, 1 AM. **Chuquisaca:** 2045/6313, Porvenir, 1 AM, 1 MSB; 2100/6523, Finca San Antonio, 18 EBD. **Cochabamba:** 1558/6442, mouth of río Chapare, 2 AM; 1658/6524, 2 km SW of Balneario Las Pozas, 1 EBD; 1702/6529, 3 km SW of Villa Tunari, 1 AM; 1705/6600, Tablas Monte, 1 AM, 1 CBF. **La Paz:** 1633/6805, Cota Cota in La Paz, 1 AM; 1 IE; 1640/6801, Mecapaca, 1 EBD. **Pando:** 1117/6855, río Nareuda, 1 AM; 1213/6824, Santa Rosa, 1 AM. **Santa Cruz:** 1636/6241, La Laguna, 10 km N of San Ramón (Ibáñez, 1985); 1722/6325, 7 km N of Santa Rosa, in province of Sara, 1 AM; 1747/6310, Santa Cruz Zoo, 2 MSB; 1756/6322, San José, 5 MNK (4 not seen); 1811/6344, 1 km NE Estancia Cuevas, 1 AM; 1925/6329, 10 km by road E of Gutierrez, Laguna Caucaya, 2 AM; 1927/6221, Cerro Colorado, 12 EBD. **Tarija:** 2216/6433, 3 km SE of Cuyambuyo, 1 CBF.

Myotis levis I. Geoffroy Saint-Hilaire, 1824

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. The type locality of *Myotis levis* is southern Brazil. LaVal (1973: 39) used the name combination *Myotis levis dinellii.* Thomas (1902: 494) distinguished *M. dinelli* from three other species in Paraguay and neighboring parts of Argentina by rufous or fawn color (unlike *M. nigricans* and *M. albescens*, which have dark grayish or blackish pelage) and lower belly not yellow, dorsal fur long (7 to 7.5 mm) and dark at base and size smaller (unlike *M. ruber*, which is larger, forearm 40 mm, and has yellow on lower belly, short fur, and reddish hairs). Measurements of the type of *M. dinellii* were given as forearm 39 mm, head and body 44, tail 41, ear 14, third metacarpal 35, lower leg 17, hind foot (*sin unguis*, without claw) 7.5, skull from front of canine to back of M3 5.5. The greatest length of skull in another specimen was 14.5.

The subspecies *M. l. dinellii* differs from *M. l. levis* in being smaller and in having long silky bicolored fur (LaVal, 1973: 39). Dorsal hairs black at base, reddish brown to blond at tips, the contrast is strong. Ventral hairs are black at base and grayish buff to white at tips. Measurements (selected from LaVal's table 12) for a series of 14 *M. l. dinellii* from Argentina were (mean ± 2 SE) forearm 37.3 ± 0.40, greatest length of skull 14.6 ± 0.20, and length of "fur" (presumably the dorsal hairs) 5.8 ± 0.42 mm.

The Bolivian specimens need more detailed study in view of these data.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size fairly small (forearm length, 35–41 mm; condylobasal length, 13–16 mm). Margin of plagiopatagium attached to side of foot. Uropatagium with a fringe of hair. Braincase relatively low, its sagittal crest absent or poorly developed. Rostrum relatively slender" (Koopman, 1994: 107). Measurements in tables 8 and 9 are of specimens from Uruguay (AM 205503), río Cachimayo (AM 39003), 1 km N and 8 km W of Comarapa (AM 260253), Quebrada Mojon (AM 261119), and Santa Cruz (AM 248202).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 598.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

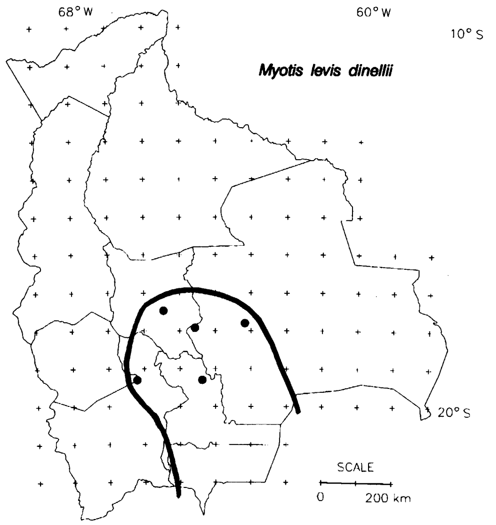


Fig. 598. Localities of known occurrence of *Myotis* (*Leuconoe*) *levis dinelli.*

Myotis levis dinellii Thomas, 1902

Myotis Dinellii Thomas, 1902e: 493 (type locality "Tucuman," Argentina). [His note here of "Bolivia (*Simons*)" was probably in error, see account of *Myotis oxyotus*].

Myotis levis dinellii: Anderson et al., 1982: 10 (tentative subspecific assignment, Santa Cruz de la Sierra). Anderson, 1985b: 8 (name in list). Anderson, 1993: 25 (general distributional records). Anderson et al., 1993: 27 (vicinity of Santa Cruz de la Sierra).

Myotis oxyotus oxyotus: Anderson et al., 1982: 10 (misidentified specimen from Finca Salo).

Myotis (*Leuconoe*) *levis dinelli*: Koopman *in* Wilson and Reeder, 1993: 212.

LOCALITIES (5) AND SPECIMENS (8): **Chuquisaca:** 1918/6422, 9 km by road N of Padilla, 1 AM. **Cochabamba:** 1728/6527, 6.6 km by road NW of Lopez Mendoza, at km 98 from Cochabamba, Quebrada Mojon, 1 AM. **Potosí:** 1918/6612, río Cachimayo, Finca Salo, 1 AM. **Santa Cruz:** 1748/6310, Santa Cruz de la Sierra, 3 AM; 1755/6434, 1 km N and 8 km W of Comarapa, 1 AM, 1 MSB.

Myotis oxyotus (Peters), 1867

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Vespertilio oxyotus* was described by Peters (1866: 19), type locality

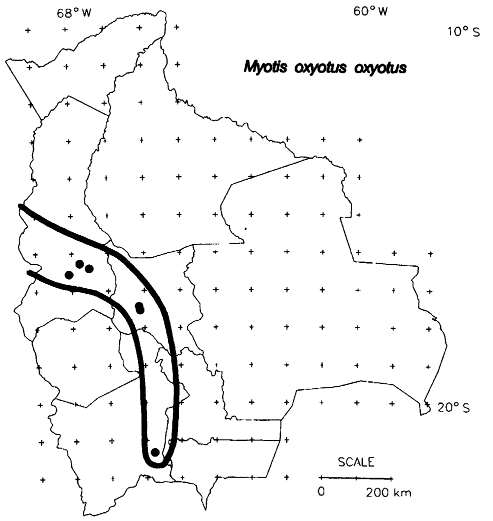


Fig. 599. Localities of known occurrence of *Myotis* (*Leuconoe*) *oxyotus oxyotus*.

Monte Chimborazo, between 9000 and 10,000 ft elevation [= 2743 and 3048 m], Ecuador. The report by Thomas (1902e: 493) of *Myotis Dinellii* from "Bolivia (*Simons*)" probably was in reference to specimens collected at Chulumani by Simons (BM 2.2.2.12, 1901.6.7.1, 1901.6.7.2) now identified as *Myotis oxyotus*).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size fairly small (forearm length, 36–44 mm; condylobasal length, 13–15 mm). Margin of pliopatagium attached to side of foot. Sagittal crest of braincase absent or poorly developed. Rostrum of medium width or fairly slender" (Koopman, 1994: 107). Measurements in tables 8 and 9 are of specimens from Sacramento Alto (LSU 23160) and Peru (AM 60598).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 599.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Myotis oxyotus oxyotus (Peters), 1866

Myotis Dinnellii Thomas, 1902e: 494 (in part; "Bolivia").

Myotis chiloensis oxyotus: Miller and Allen, 1928: 194 (Chulumani).

Myotis oxyotus oxyotus: LaVal, 1973: 42 (Chulumani). Anderson et al., 1982: 10.

Myotis oxyotus: Anderson, 1985b: 8 (name in list).

Myotis (*Leuconoe*) *oxyotus*: Koopman *in* Wilson and Reeder, 1993: 214.

Myotis oxyotus oxyotis: Anderson, 1993: 25 (misspelling, general distributional records).

Myotis oxyota: Woodman, 1993: 544 (change of name). Ibáñez et al., 1994: 80 (first specimen from Cochabamba).

There are three specimens from Chulumani in the British Museum, so more than one species of *Myotis* could be represented here. LaVal (1973) cited BM 2.2.2.125 as *M. oxyotus.*

LOCALITIES (6) AND SPECIMENS (12): **Cochabamba:** 1725/6609, near Laguna Alalai, 4 EBD; 1732/6607, 1.3 km W of Jamachuma, 1 AM, 1 MSB. **La Paz:** 1616/6747, Sacramento Alto, 8 km by road N of Chuspipata, 1 LSU; 1624/6731, Chulumani, 1800 m, 3 BM; 1633/6805, Cota Cota, 1 CBF. **Potosí:** 2119/6546, Finca Salo, 1 ANSP.

Myotis riparius Handley, 1960

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Myotis simus riparius* was described by Handley (1960: 466), type locality Tacarcuna Village, río Pucro, Darien, Panamá. *Myotis guaycuru*—described by Proença (1943: 313), type locality Salobra, Mato Grosso, Brazil—may be an older name for this species, but the question needs to be restudied (LaVal, 1973: 32).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size fairly small (forearm length, 31–39 mm; condylobasal length, 13–14). Margin of plagiopatagium attached to side of foot. Calcar with a keel. Uropatagium without a fringe of hair. Braincase usually with a well developed sagittal crest. Rostrum of medium width. Middle upper premolar usually at least somewhat displaced medially from the toothrow" (Koopman, 1994: 106). Measurements in tables 8 and 9 are of specimens from Estancia Cachuela Esperanza (AM 260251) and Peru (AM 30775).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 600.

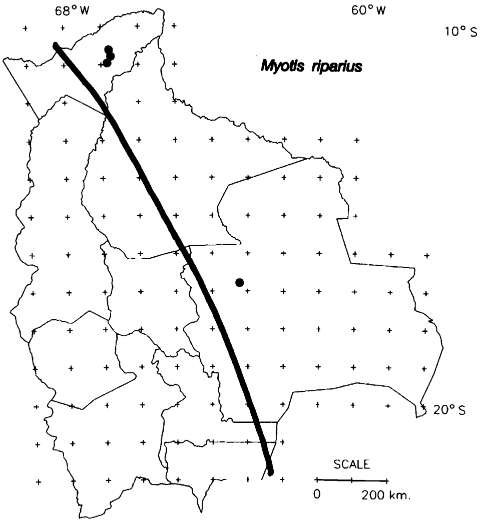


Fig. 600. Localities of known occurrence of *Myotis* (*Leuconoe*) *riparius*.

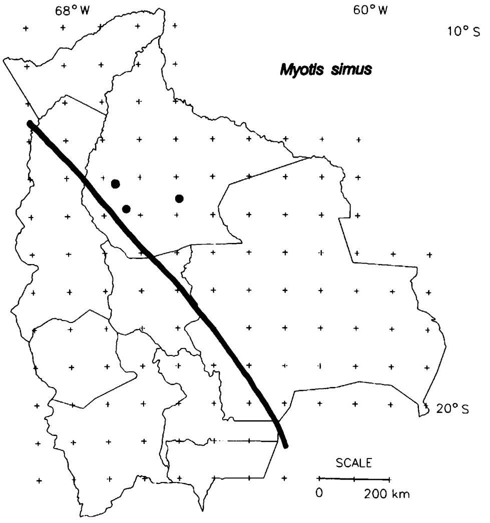


Fig. 601. Localities of known occurrence of *Myotis* (*Leuconoe*) *simus*.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Myotis riparius: Anderson, 1991: 143 (first Bolivian specimen). Emmons and Smith, 1992 (Centro Dieciocho, Ingavi). Anderson, 1993: 25 (general distributional records).

Myotis riparia: Woodman, 1993: 544 (change of name).

LOCALITIES (3) AND SPECIMENS (4): **Pando:** 1036/6647, Centro Dieciocho (Emmons and Smith, 1992); 1057/6650, Ingavi, 2 CBF (Emmons and Smith, 1992). **Santa Cruz:** 1647/6314, Estancia Cachuela Esperanza, 1 AM.

Myotis simus Thomas, 1901

TAXONOMIC REMARKS: Cabrera (1958: 103) proposed the subgenus *Hesperomyotis* for *Myotis simus*. The name used for Bolivian specimens has its type locality outside of Bolivia. *Myotis simus* was described by Thomas (1901c: 541), type locality "Sarayacu, Peru," on the río Ucayali in Loreto.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size fairly small (forearm length, 35–40; condylobasal length, 12–14). Calcar usually with a keel. Rostrum relatively short and broad. Middle upper premolar greatly reduced and displaced medially from the toothrow (anterior upper premolar also somewhat displaced)" (Koopman, 1994: 106). Measurements in tables 8 and 9 are of specimens from near San Javier (AM 211155–211199), in part.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 601.

HABITAT: Roosting sites in hollow trees were reported by Aguirre (1994: 98) near Espíritu, Beni. Sites were shared with *Eptesicus furinalis*.

HABITS AND BEHAVIOR: In a study during the first 6 hours of darkness at Espíritu, Beni (Aguirre, 1994: 89), one specimen of this species were netted between the hours of 1800 and 2000 and one between 2000 and 2200.

FOOD: Two stomachs (Aguirre, 1994: 83) contained remains of Orthoptera (Grillidae), Hemiptera (Corixidae), Homoptera (of at least two families), Coleoptera (at least five families), Lepidoptera, and Diptera (Nematocera). Nine of 10 measureable prey items were less than 10 mm in length (Aguirre, 1994: 87).

REPRODUCTION: Ten pregnant females were taken in September, each with a single embryo.

Scientific synonyms used for Bolivian specimens are:

Myotis simus: Anderson et al., 1982: 10. Anderson, 1985b: 8 (name in list). Wilson and Salazar, 1990: 52 (río Curiraba). Anderson, 1993: 25 (general distributional records). Aguirre, 1994: 61 (two localities near Espíritu).

Myotis (*Leuconoe*) *simus*: Koopman *in* Wilson and Reeder, 1993: 215.

Myotis sima: Woodman, 1993: 544 (change of name).

Localities (4) and Specimens (48): **Beni:** 1411/6639, 1411/6641, both near Espíritu, 2 (Aguirre, 1994: 66); 1434/6455, 23 km W of San Javier, 43 AM, 1 MNLP, 1 IML; 1450/6623, río Curiraba, 1 US (Wilson and Salazar, 1990: 52).

Subgenus *Selysius* Bonaparte, 1841

The type species is *Vespertilio mystacinus* from Europe. "Anterior upper premolar usually in toothrow and not greatly reduced. Size medium to relatively small. Maxillary toothrow relatively short. Coronoid process of mandible relatively low. Sagittal and lambdoidal crests poorly developed. Plagiopatagium broad, its margin tending to be attached well down on the small foot. Calcar usually with a well developed keel. Hair on ventral side of uropatagium tending to converge toward the center forming an insect trap" (Koopman, 1994: 102).

Myotis keaysi J. A. Allen, 1914

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Myotis ruber keaysi* was described by Allen (1914a: 383), type locality "Inca Mines (altitude 6000 feet)," Puno, Peru. LaVal (1973: 22) used the name combination *Myotis keaysi keaysi*.

Morphological Characters and Comparisons: "Size medium (forearm length, 31–42 mm; condylobasal length, 12–14 mm). Sagittal crest well developed" (Koopman, 1994: 105). Measurements in tables 8 and 9 are of specimens from Ecuador (AM 67607), Sacramento Alto (LSU 23161, 23162), Rancho Tambo (AM 262647, and 5 km SW of Comarapa (AM 263237, 263238).

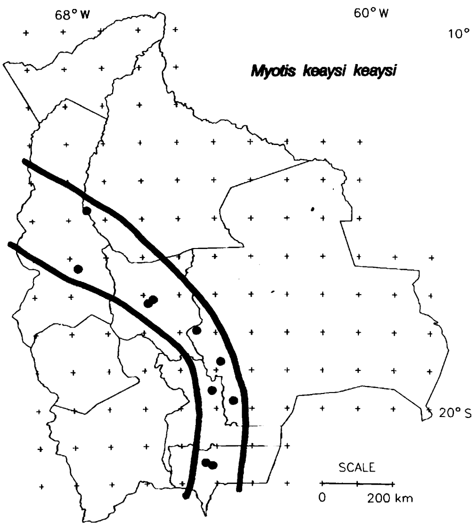


Fig. 602. Localities of known occurrence of *Myotis* (*Selisius*) *keaysi keaysi*.

Distributional Notes: Known localities are listed below and mapped in figure 602.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Myotis keaysi keaysi Allen, 1914

Myotis keaysi keaysi: Anderson et al., 1982: 10. Anderson and Webster, 1983: 3 (34 km SE of Padilla, 67 km E of Tarija). Anderson, 1985b: 8 (name in list). Anderson, 1993: 25 (general distributional records).

Myotis nigricans nigricans: Anderson et al., 1982: 10 (two specimens from near Padilla and from 67 km E of Tarija).

Myotis keaysi: Ibáñez, 1985: 330 (1707/6544). Ibáñez et al., 1994: 80 (1707/6544).

Myotis (*Selysius*) *keaysi*: Koopman *in* Wilson and Reeder, 1993: 211.

Localities (10) and Specimens (12): **Chuquisaca:** 1932/6407, 34 km SE of Padilla, 1 FM. **Cochabamba:** 1707/6544, Puerto Sillar, 1 EBD, or El Sillar, 45 km SW of Villa Tunari (Ibáñez, 1985); 1713/6552, Corani, 1 MSB. **La Paz:** 1445/6730, río Quiquibey, 1 MNLP (not seen); 1616/6747, Sacramento Alto, 8 km by road N of Chuspipata, 2575 m, 2 LSU. **Santa Cruz:** 1757/6432, 5 km SW of Comarapa, 2 AM; 1846/6352, 13 km

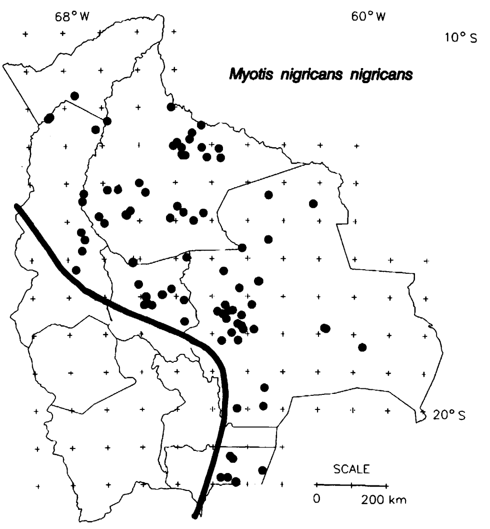


Fig. 603. Localities of known occurrence of *Myotis* (*Selisius*) *nigricans nigricans*.

by road NW of Masicuri, 1 AM; 1948/6331, Cerro Itahuaticua, 1 MNK. **Tarija:** 2127/6419, Rancho Tambo, 61 km by road E of Tarija, 1 AM; 2131/6408, 67 km E of Tarija, 1 FM.

Myotis nigricans (Schinz), 1821

TAXONOMIC REMARKS: *Vesp*[*ertilio*]. *nigricans* was described by Schinz (1821: 179), type locality Fazenda de Agá, near rio Iritiba, Espírito Santo, Brazil (see also LaVal, 1973: 9, for neotype).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size medium to fairly small (forearm length, 31–40 mm; condylobasal length, 11–14 mm). Braincase of medium height, occiput not raised above it, and rostrum varying from medium to fairly broad. Keel on calcar absent or poorly developed" (Koopman, 1994: 105). Measurements in tables 8 and 9 are from pooled data (specimens from 12 localities), from opposite Costa Marques (AM 209766), from mouth of the río Ibare (AM 211200–211201), and from Estación Biológica del Beni (AM 261796–261799, 261816).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 603. This is one of the most common bats in lowland Bolivia, 64 of 285 bats of 32 species studied by Aguirre (1994: 66) at Espíritu, Beni, were *M. nigricans.*

HABITAT: Roosting sites in buildings were reported by Aguirre (1994: 99) near Espíritu, Beni. Sites were shared with *Myotis albescens.*

HABITS AND BEHAVIOR: In a study during the first 6 hours of darkness at Espíritu, Beni (Aguirre, 1994: 89), specimens of this species were netted in each 2-hour period.

FOOD: The contents of seven stomachs (Aguirre, 1994: 83) included remains of Orthoptera (Grillidae), Hemiptera, Homoptera (of at least two families), Coleoptera (at least four families), Lepidoptera, Diptera (two families), and Hymenoptera (family not determined).

REPRODUCTION: Pregnant females (six, each with a single embryo) were taken in August (2), September (3), and October (1). "Young" individuals were recorded in March (4), September (3), October (1), and December (4).

Scientific synonyms used for Bolivian specimens are:

Myotis nigricans nigricans (Schinz), 1821

Vespertilio nigricans: Dobson, 1878: 320 (three adult skins from Bolivia). Thomas, 1898b: 2 (Caiza and San Francisco). Osgood, 1916: 214 (Todos Santos and Trinidad). Neotype designated by LaVal, 1973: 9 (from "42 km S Rio de Janeiro, Brazil, elevation 33 m").

Vespertilio hypothryx d'Orbigny and Gervais, 1847: 16 (province de Moxos, the type locality). Not cited by LaVal, 1973, in his revision of Neotropical *Myotis*. Listed by Cabrera, 1958: 101, as a synonym of *M. nigricans.*

Myotis sp.: Thomas, 1902a: 126 (Paratani).

Myotis nigricans: Thomas, 1925: 576 (Carapari). Myers and Wetzel, 1983: 17 (eight localities in Beni, Santa Cruz, and Tarija). Hershkovitz, 1987b: 74 (Moxos). Ibáñez and Ochoa, 1989: 216 (Espejillos, Guirapembi). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Sawada and Harada, 1986: 368 (Buena Vista, Okinawa, Hardeman). Wilson and Salazar, 1990: 52 (Estación Biológica del Beni). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Aguirre, 1994: 61 (seven localities near Espíritu). Aguirre and Urioste, 1994: 74 (Espíritu).

Myotis nigricans nigricans: Miller and Allen, 1928: 179 (Buenavista, Caiza, Rosario, río Surutú, Rurrenabaque). Sanborn, 1932a: 181 (Incachaca). Wilson and LaVal, 1974: 1 (synonymy, general information on species). Ibáñez, 1981: 137 (map). Anderson et al., 1982: 10. Webster and Fugler, 1984: 18 (Tomonoco). Anderson, 1985b: 8 (name in list). Anderson, 1993: 25 (general distributional records). Anderson et al., 1993: 28 (vicinity of Santa Cruz de la Sierra).

Miotis nigricans: Arce Pereira et al., 1963: 152 (misspelled name in list; Todos Santos).

Myotis nigricans caucensis: Webster and Fugler, 1984: 18 (8 km N Sacramento Alto).

Myotis (*Selysius*) *nigricans*: Koopman *in* Wilson and Reeder, 1993: 213.

LOCALITIES (99) AND SPECIMENS (1544): **Beni:** 1200/6506, Puerto Moré, 9 AM; 1221/6651, Rosario, 4 US; 1229/6417, left bank of río Iténez, opposite Costa Marques [Brazil], 1 AM; 1241/6432, 15 km above Horquilla, on río Machupo, 1 AM; 1251/6436, La Esperanza, 1 FM; 1256/6457, Azunta, 13 FM; 1301/6503, Providencia, 110 FM; 1304/6416, Acapulco, 16 FM; 1304/6449, San Joaquín, 465 FM; 1306/6348, Buenavista, 1 FM; 1315/6449, Totai, 2 FM; 1317/6443, San Ramón, 3 FM; 1317/6448, Yuatre, 10 FM; 1320/6408, Magdalena, province of Iténez, 1 US, 27 FM; 1321/6345, El Mojon, 94 FM; 1400/6600, Nuevo Mundo, Yacuma, 13 EBD; 1411/6638, 1413/6639, 1413/6640, all near Espíritu, 64 (Aguirre, 1994: 66); 1413/6640, Espíritu, 50 IE; 1411/6653, Santa Rosa, 1 FM; 1415/6550, Venecia, 2 EBD; 1428/6734, Rurrenabaque, 10 AM; 1437/6457, mouth of río Ibare, 5 AM; 1444/6615, Campamento 08, 2 MNLP; 1447/6447, Trinidad, 7 AM, 7 FM, 2 MSU; 1448/6414, Casarabe, 1 AM, 2 MSB; 1450/6622, Estancia Tajibos, 9 EBD, 2 MNLP; 1450/6623, río Curireba, 2 US; 1451/6621, Estación Biológica del Beni, 39 AM, 15 CBF, 22 MSB, 4 US; 1451/6621, Porvenir, 1 CBF, 3 EBD; 1451/6621, Totaisal, río Matos, 5 CBF, 1 EBD, 4 US; 1451/6621, 50 km [E of] San Borja, 3 EBD; 1451/6621, Florida, 45 km from San Borja, 1 EBD; 1452/6707, Km 35, NW of Yucumo, 5 AM, 3 CBF, 3 MSB; 1456/6509, río Tijamuchi, 6 MSB; 1500/6430, San Andres, 25 FM; 1503/6658, 1 km E of La Embocada, at Estancia La Cabaña, 1 UMMZ; 1602/6610, Oromomo, 4 CBF. **Cochabamba:** 1558/6442, mouth of río Chapare, 36 AM; 1640/6603, Misiones de Mosetenes, 4 BM (not seen); 1648/6508, Todos Santos, 77 (Osgood, 1916, at AM and FM); 1657/6523, Balneario Las Pozas, 1 EBD; 1657/6524, San Antonio mission, on río Chimoré, 15 AM; 1657/6524, río San Antonio at junction with río Espírito Santo, 2 AM, 13 FM (Osgood, 1916, cited 25); 1700/6550, Yungas, 7 AM; 1706/6447, Sajta, 2 AM, 2 CBF, 2 MSB; 1711/6548, Yungas de Locotal, 1 IML; 1713/6554, 13 km N of Colomi, 1 AM; 1714/6541, Incachaca, 1 CM; 1740/6446, Carahuasi, 8 IML. **La Paz:** 1234/6710, Santa Ana de Madidi, 1 AM, 1 MSB; 1416/6732, río Beni, 3 AM, 8 MSB; 1517/6737, Sararia, 6 UMMZ; 1529/6731, Tomonoco, 1 mi [= 1.6 km] W of Puerto Linares, 4 MSU, 5 TTU; 1546/6736, Caranavi, 2 AM; 1616/6747, Sacramento Alto, 8 km N of Chuspipata, 1 TTU. **Pando:** 1140/6743, San Miguel, 1 CBF; 1213/6824, Santa Rosa, 1 AM; 1216/6827, 8 km SO de [= SW of] Santa Rosa, 1 CBF. **Santa Cruz:** 1420/6225, PRBN, 2 MNK; 1433/6110, 4 km E of Aserradero Moira, 1 EBD; 1433/6111, río Paragua, Aserradero Moira, 4 EBD; 1530/6225, Puerto Almacen, 6 MNK (3 not seen); 1543/6309, 6 km by road W of Ascención, 1 AM, 2 MSB; 1636/6241, La Laguna, 2 EBD; 1636/6242, 10 km N of San Ramón, 2 AM, 2 MSB; 1647/6314, Estancia Cachuela Esperanza, 1 AM; 1714/6338, 4.5 km N of Buen Retiro, 2 AM, 1 MSB; 1722/6325, 7 km N of Santa Rosa, in province of Sara, 5 AM; 1722/6325, province of Sara, 1 CM; 1713/6253, Okinawa, 5 (Sawada and Harada, 1986: 368); 1723/6332, San Miguel Rincón, 1 AM, 1 MSB; 1724/6351, río Surutó, 6 AM; 1722/6325, Buenavista, province of Sara, 12 AM, 12 CM, 8 FM, 3 BM, 4 (Sawada and Harada, 1986: 368); 1728/6342, 4 km SW of Buena Vista, 2 MSB; 1730/6310, Warnes, 12 FM; 1736/6336, San Rafael de Amboró, 2 AM, 1 MSB; 1744/6317, 8 km W of Santa Cruz, 1 MSB; 1747/6310, Santa Cruz Zoo, 1 MNK, 9 MSB; 1748/6310, Santa Cruz de la Sierra, 1 MNK, 11 CM; 1750/6050, San José de los Chiquitos, 1 IML; 1751/6047, Chiquitos, 1 CM; 1753/6249, Lomas de Arena, 1 MNK (not seen); 1753/6307, Las Lomitas, 15 km S of Santa Cruz, 1 MNK; 1758/6327, Espejillos, 2 EBD; 1810/6316, Ingeniero Mora, 1 MSU; 1811/6344, 1 km NE Estancia

Cuevas, 1 AM; 1820/5945, Roboré, 1 AM, 1 MSB; 1926/6231, Guirapembi, 2 EBD; 1955/6233, 50 km S of Cerro Colorado, 1 EBD; 1959/6318, 72 km ESE of Monteagudo, 5 FM; 1620/6340, Hardeman, 18 (Sawada and Harada, 1986: 368; 77 specimens, Harada, in litt.). **Tarija:** 2115/6330, San Francisco, on the río Pilcomayo, 1 (Thomas, 1898b); 2119/6325, 8 km S and 10 km E of Villa Montes, 1 AM; 2138/6234, Estancia Bolívar, 2 AM, 1 CBF; 2149/6334, Caiza, 8 (Thomas, 1898b); 2149/6346, Caraparí, 1 (Thomas, 1925); 2155/6319, 40 km [E] from Yacuiba, in the Gran Chaco, 1 CBF.

Myotis, species not determined

LOCALITIES (10) AND SPECIMENS (12): **Beni:** 1415/6550, Camiari, prov. Yacuma, 1 EBD (not seen). **Cochabamba:** 1714/6541, Incachaca, 1 BM; 1734/6621, Paratani, 1 BM (1902.1.1.2; Thomas, 1902a: 126 as *Myotis* sp.; Miller and Allen, 1928: 192, as *M. chiloensis dinellii*; not seen). **La Paz:** 1309/6712, río Beni, 1 MSB. **Santa Cruz:** 1636/6242, 10 km N of San Ramón, 2 AM; 1728/6342, 4 km SW of Buena Vista, 1 MSB; 1807/5937, 24 km by road N of Santiago de Chiquitos, on río Tucavaca, 1 AM; 1811/6344, 1 km NE Estancia Cuevas, 1 AM; 1948/6313, Charaqua, 1 BM. **Tarija:** 2138/6234, Estancia Bolívar, 1 AM. **Department unknown:** 1 AM.

Genus *Rhogeessa* Allen, 1866

The term "little yellow bat" has been used for members of this genus.

TAXONOMIC REMARKS: Some authors have umlauted the second "e" in *Rhogeessa*. However, the International Code of Zoological Nomenclature states that "No diacritical mark ,. . . is to be used in a scientific name" (Art. 27; International Commission on Zoological Nomenclature, 1985).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Ears not greatly enlarged. Width of each auditory bulla less than space between them. Anterior and middle upper molars with the mesostyle unreduced, the W-shaped pattern not distorted. Anterior and middle lower molars with the talonid larger than the trigonid. Lateral lower incisor reduced. Rostrum in lacrimal region not greatly broadened. Anterior palatal emargination not greatly reduced" (Koopman, 1994: 126). Only one of the seven known species reaches Bolivia.

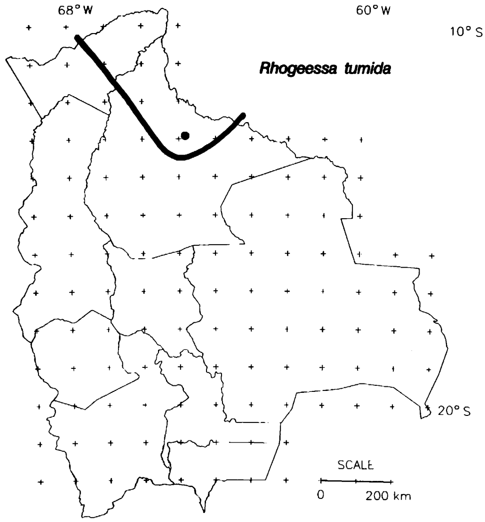


Fig. 604. Locality of known occurrence of *Rhogeessa tumida*.

Rhogeessa tumida Allen, 1866

TAXONOMIC REMARKS: Sometimes placed in the subgenus *Rhogeessa*. The name used for the Bolivian specimen has its type locality outside of Bolivia. *Rhogeessa tumida* was described by H. Allen (1866: 286), type locality Mirador, Veracruz, Mexico.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Ears relatively short. Hairs of dorsum dark with two bands. Size varying from large to small (forearm length, 25–34 mm). Lingual cingulum of upper canine always with at least some indication of cusps. Uropatagium mostly naked. Outer lower incisor usually not reduced. Postorbital constriction poorly developed. Third metacarpal relatively short" (Koopman, 1994: 126). Measurements in tables 8 and 9 are of the only Bolivian specimen and one from Brazil (FM 26465).

DISTRIBUTIONAL NOTES: Known in Bolivia from only one locality, mapped in figure 604.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Only one scientific name has been used for the Bolivian specimen:

Rhogeessa tumida: Anderson et al., 1982: 11 (specimen noted below). Anderson, 1985b: 8 (name in list). Anderson, 1993: 26 (general distributional records).

One Bolivian specimen is known, FM 115807, from Caravana in Beni (1255/6449).

FAMILY MOLOSSIDAE GERVAIS *in* CASTELNAU, 1855

These are the free-tailed bats. "Second digit of wing reduced to the metacarpal and a single vestigial phalanx. Tail long, extending a considerable distance beyond the somewhat shortened uropatagium. Trochiter of humerus large and making an extensive articulation with the scapula. Last cervical and first thoracic vertebrae fused with one another. Rostrum may be relatively long, or shortened in varying degrees. Premaxillae with nasal branches, but palatal branches may be greatly reduced. Ears usually greatly broadened or lengthened. Pollex unmodified" (Koopman, 1994: 135).

Genus *Eumops* Miller, 1906

The term "mastiff bat" is used for members of this genus as well as members of some other molossid genera. The genus was revised by Eger (1977).

Morphological Characters and Comparisons: Dental formula i1/2, c1/1, p2/2, m3/3, total 30, but anterior upper premolar usually greatly reduced and sometimes absent. "Anterior palatal emargination absent. Last upper molar variable. Ears fairly large, with considerable slouch, usually barely joined. Basisphenoid pits well developed but of variable depth" (Koopman, 1994: 143).

A species in addition to those treated below, and that may occur in Bolivia, is *E. dabbenei*. It occurs south of Bolivia in Argentina (Barquez et al., 1993: 79) and in Paraguay. A wide gap exists between these locations and the records from northern South America (Eger, 1977: 37). Questions that need further examination include the following: Are these populations really disjunct or does the species occur in the present gap and has just not been found? Are these populations actually conspecific? An erroneous tentative identification and report of *E. dabbenei* from Bolivia (Anderson, 1993: 26) is noted under *E. perotis* below.

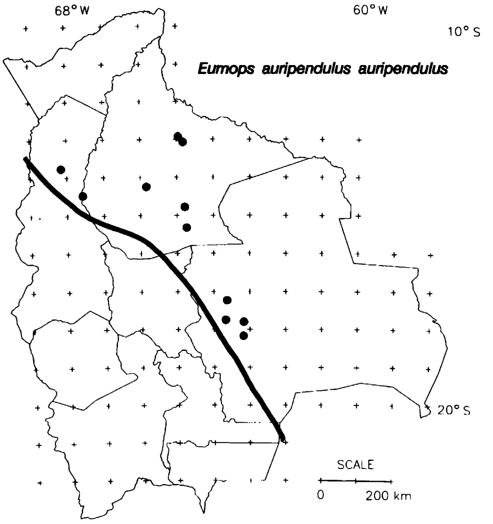


Fig. 605. Localities of known occurrence of *Eumops auripendulus auripendulus*.

Eumops auripendulus (Shaw), 1800

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Vespertilio auripendulus* was described by Shaw (1800: 137); type locality was restricted to French Guiana by Husson, 1962.

Morphological Characters and Comparisons: "Last upper molar greatly reduced. Basisphenoid pits relatively deep. Size medium (forearm length, 55–68 mm). Ears relatively short. Tragus small and pointed" (Koopman, 1994: 143). Measurements in tables 8 and 9 are of specimens from 10 km E of Ingeniero Mora (MSU 31039, 31042), 4.5 km N of Buen Retiro (AM 260305), 4.5 km N and 1.5 km E of Cerro Amboró (AM 261849), and Rurrenabaque (AM 248209–248230).

Distributional Notes: Known localities are listed below and mapped in figure 605.

No detailed Bolivian data are available on habitat, habits, behavior, and food.

Reproduction: Twelve pregnant females with single embryos were taken in August.

Scientific synonyms used for Bolivian specimens are:

Eumops auripendulus auripendulus (Shaw), 1800

Eumops abrasus milleri: Sanborn, 1932: 352 (Ixiamas).

Eumops auripendulus: Goodwin, 1960: 5 (first use of name combination).

Eumops auripendulus auripendulus: Eger, 1977: 26 (revision, three localities). Anderson et al., 1982: 11. Myers and Wetzel, 1983: 28 (Azunta, San Joaquín, and 10 km by road E of Ing. Mora). Anderson, 1985b: 8 (name in list). Anderson, 1993: 26 (general distributional records). Anderson et al., 1993: 29 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (11) AND SPECIMENS (49): **Beni:** 1256/6457, Azunta, 2 FM; 1304/6449, San Joaquín, 4 FM; 1415/6550, Venecia, 4 EBD; 1428/6734, Rurrenabaque, 23 AM; 1447/6447, Trinidad, 1 CBF (owl pellet); 1519/6444, Camiaco, 16 km N of Limoquije, 1 AM. **La Paz:** 1345/6809, Ixiamas, 1 US (coordinates given by Eger, 1977, are incorrect). **Santa Cruz:** 1714/6338, 4.5 km N of Buen Retiro, 1 AM, 1 MSB; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 1 AM, 1 MSB; 1748/6310, Santa Cruz, 1 from owl pellet in La Paz; 1810/6311, 10 km E of Ingeniero Mora, 8 MSU (5 not seen).

Eumops bonariensis (Peters), 1874

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Promops bonariensis* was described by Peters (1874: 232); type locality Buenos Aires, Argentina. Barquez (Mares et al., 1995) has found two small species of *Eumops* occurring sympatrically in Tucumán. These he identifies as *E. bonariensis* and *E. patagonicus* of Thomas (1924b: 234). Furthermore, he suggests that *E. beckeri* of Sanborn (1932b) is synonymous with *E. patagonicus* and that Bolivian material previously assigned to *E. bonariensis beckeri* should now be assigned to *E. patagonicus*. The available Bolivian specimens listed below should be restudied, with the distinguishing characters described by Barquez in mind, to test the hypothesis that all of the Bolivian material is conspecific. Specimens from as far north as Veracruz, Mexico, have been assigned to *E. bonariensis* (Koopman *in* Wilson and Reeder, 1993: 233), and so all material from north of Argentina and Bolivia also needs to be reviewed.

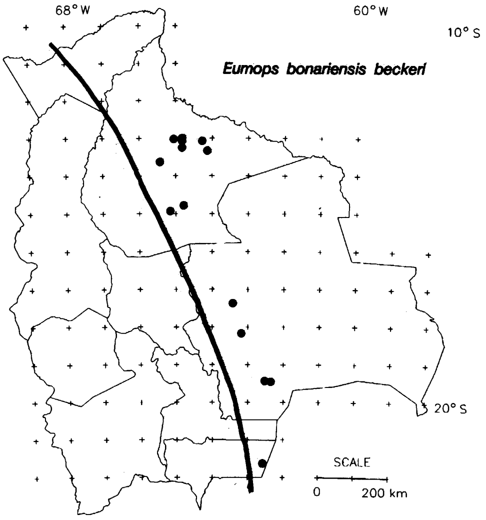


Fig. 606. Localities of known occurrence of *Eumops bonariensis beckeri*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Last upper molar somewhat reduced. Basisphenoid pits relatively deep. Size relatively small (forearm length, 36–50 mm)" (Koopman, 1994: 143). Measurements in tables 8 and 9 are of specimens from San Joaquín (FM 96028–96031, 96033, 96035–96037), río Tijamuchi (AM 261850), and río Yacuma (AM 211261).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 606.

No detailed Bolivian data are available for habitat, habits, behavior, and food.

REPRODUCTION: Two pregnant females with single embryos were taken in November.

Scientific synonyms used for Bolivian specimens are:

Eumops bonariensis beckeri Sanborn, 1932

Eumops bonariensis beckeri Sanborn, 1932b: 355 (type locality "Trinidad, El Beni, Bolivia"). Eger, 1977: 32 (three Bolivian localities). Ibáñez, 1981: 160 (map). Anderson et al., 1982: 12. Myers and Wetzel, 1983: 28 (San Joaquín, Magdalena). Anderson, 1985b: 8 (name in list). Anderson, 1993: 26 (general distributional records). Anderson et al., 1993: 29 (vicinity of Santa Cruz de la Sierra).

Eumops bonariensis: Osgood, 1916: 214 (29 from Trinidad). Ibáñez and Ochoa, 1989: 217 (Guirapembi).

Eumops bonariensis becheri: Freeman, 1981: 154 (misspelling).

LOCALITIES (16) AND SPECIMENS (396): **Beni:** 1300/6449, Aguadulce, 1 FM; 1301/6503, Providencia, 34 FM; 1304/6416, Acapulco, 2 FM; 1304/6449, San Joaquín, 190 FM (not all seen); 1315/6449, 20 km S of San Joaquín, 1 AM; 1320/6408, Magdalena, province of Iténez, 18 US, 2 FM; 1338/6526, río Yacuma, 4 km from mouth, 21 AM; 1447/6447, Trinidad, 16 AM, 54 CBF (owl pellets), 11 FM, 1 MCZ, 3 US; 1456/6509, río Tijamuchi, 1 AM; coordinates unknown, Las Pavas, 1 FM. **Santa Cruz:** 1722/6325, 7 km N of Santa Rosa, in province of Sara, 1 AM; 1810/6311, 10 km E of Ingeniero Mora, 1 MSU (not seen); 1926/6231, Guirapembi, 3 EBD; 1927/6221, Cerro Colorado, 2 EBD; coordinates unknown, Nueva Moka, 32 MACN (not seen). **Tarija:** 2138/6234, Estancia Bolívar, 1 CBF.

Eumops glaucinus (Wagner), 1843

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Dysopes glaucinus* was described by Wagner (1843: 368), type locality Cuiaba, Mato Grosso, Brazil. Miller (1906: 85) used the name *Eumops glaucinus.*

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Last upper molar considerably reduced. Basisphenoid pits of moderate depth. Size fairly large (forearm length, 64–77 mm). Ears relatively short and heavily keeled" (Koopman, 1994: 143). Measurements in tables 8 and 9 are of specimens from Magdalena (US 390643, 390644), 10 km E of Ingeniero Mora (MSU 31047–31050), Espíritu (MNLP 65), and Cerro Colorado (EBD 14062, 14287, 14313–14317).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 607.

HABITAT: A roosting site 1.8 m from the ground in a hollow tree was reported by Aguirre (1994: 96) near Espíritu, Beni.

HABITS AND BEHAVIOR: In a study during the first 6 hours of darkness near Espíritu, Beni (Aguirre, 1994: 89), the only bat of this species netted was taken between the hours of 2000 and 2200.

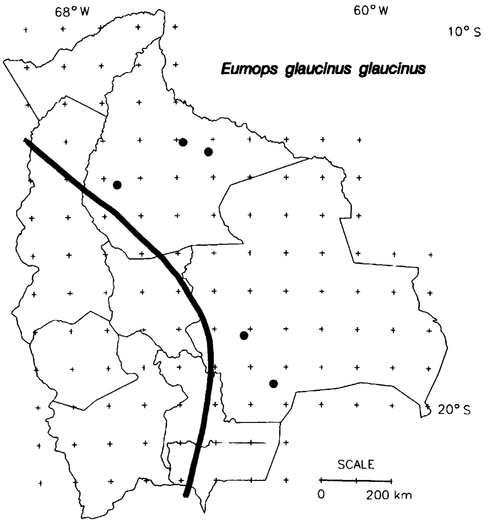


Fig. 607. Localities of known occurrence of *Eumops glaucinus glaucinus.*

FOOD: Four stomachs from Espíritu, Beni (Aguirre, 1994: 83), contained Zygoptera, Orthoptera (Grillidae), and Coleoptera (Hydrophylidae).

REPRODUCTION: One pregnant female with a single embryo was taken in September.

Scientific synonyms used for Bolivian specimens are:

Eumops glaucinus glaucinus (Wagner), 1843

Molossus glaucinus: Dobson, 1878: 418 (Bolivia, skin and skull).

Eumops glaucinus glaucinus: Eger, 1977: 40 (Magdalena). Ibáñez, 1981: 167 (map). Anderson et al., 1982: 12. Myers and Wetzel, 1983: 31 (10 km by road E of Ingeniero Mora). Anderson, 1985b: 8 (name in list). Anderson, 1993: 26 (general distributional records).

Eumops glaucinus: Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Wilson and Salazar, 1990: 53 (Estación Biológica del Beni). Barquez and Ojeda, 1992: 250 (mention Santa Cruz report by Myers and Wetzel, 1983). Aguirre, 1994: 63 (two localities near Espíritu).

LOCALITIES (8) AND SPECIMENS (25): **Beni:** 1304/6449, San Joaquín, 1 FM; 1320/6408, Magdalena, province of Iténez, 2 US; 1413/

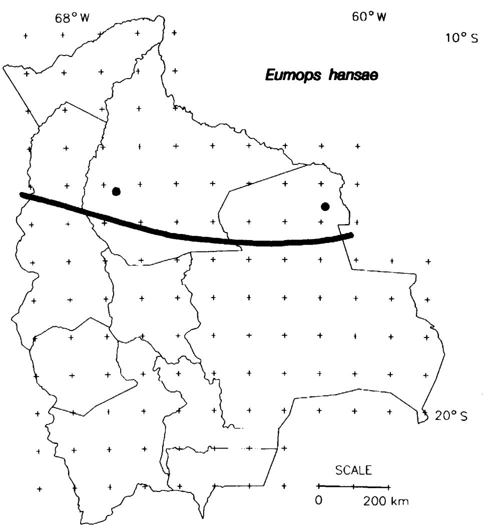


Fig. 608. Localities of known occurrence of *Eumops hansae*.

6640, Espíritu, Arroyo Carnaval, 1 IE (and 5 specimens from two localities near Espíritu; Aguirre, 1994: 66). **Santa Cruz:** 1810/6311, 10 km E of Ingeniero Mora, 4 MSU; 1927/6221, Cerro Colorado, 7 EBD; coordinates unknown, Nueva Moka, 4 MACN (not seen). **Department unknown:** "Bolivia" only, 1 BM.

Eumops hansae Sanborn, 1932

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Eumops hansae* was described by Sanborn (1932b: 356), type locality Colonia Hansa, Joinville, Santa Catarina, Brasil.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Last upper molar unreduced. Basisphenoid pits unusually deep. Size relatively small (forearm length, 36–42 mm)" (Koopman, 1994: 143). Measurements in table 8 are of CBF 3342 (Aguirre and Urioste, 1994: 74) and EBD 14295 from 38 km E of Florida. Cranial measurements of these two females are cranial length 18.23 mm (in 3342), condylobasal length 17.3 (in 14295), zygomatic breadth 11.3 and 10.8, respectively, and length of upper maxillary tooth row 8.2 (in 3342).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 608.

HABITAT: No data.

HABITS AND BEHAVIOR: In a study during the first 6 hours of darkness near Espíritu, Beni (Aguirre, 1994: 89), the only bat of this species netted was taken between the hours of 2000 and 2200.

FOOD: One stomach from Espíritu, Beni (Aguirre, 1994: 83) contained Orthoptera (Grillidae).

REPRODUCTION: No data.

Scientific synonym used for Bolivian specimen is:

Eumops hansae: Ibáñez and Ochoa, 1989: 219 (38 km E of La Florida). Anderson, 1993: 26 (cited Ibáñez and Ochoa). Aguirre, 1994: 64 (Tajibal del Peru near Espíritu). Aguirre and Urioste, 1994: 74 (Espíritu).

LOCALITIES (2) AND SPECIMENS (2): **Beni:** 1413/6641, Espíritu, 1 (Aguirre and Urioste, 1994: 74). **Santa Cruz:** 1436/6053, 38 km E of La Florida, 1 EBD.

Eumops perotis (Schinz), 1821

Moloso de Orejas Anchos

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia; *Moloss*[*us*]. *perotis* was described by Schinz (1821: 870), type locality Villa So Salvador, Campos do Goitacazes, Rio Paraiba, Rio de Janeiro, Brazil). Sanborn (1932b: 349) first used the name combination *Eumops perotis perotis*. *Promops Trumbulli* was described by Thomas (1901e: 190), type locality Pará, Brazil. *Eumops perotis trumbulli* is said to be smaller than *E. p. perotis* and to have a longer third commissure of M3 (Eger, 1977: 53).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Last upper molar considerably reduced. Basisphenoid pits relatively deep. Size relatively large (forearm length, 67–84 mm). Ears relatively long. Tragus broad and square" (Koopman, 1994: 144).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 609.

No detailed Bolivian data are available on habitat, habits, behavior, and food.

REPRODUCTION: No data.

Scientific synonyms used for Bolivian specimens are given under the subspecies below.

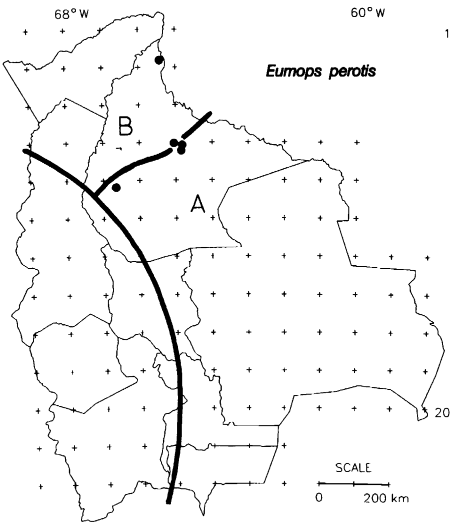


Fig. 609. Localities of known occurrence of two subspecies of *Eumops perotis*, *E. p. perotis* (A) and *E. perotis trumbulli* (B).

Eumops perotis perotis (Schinz), 1821

Molossus perotis: Dobson, 1876: 714 (Bolivia); 1878: 416 (Bolivia).

Eumops perotis perotis: Eger, 1977: 48 (revision, none from Bolivia). Anderson et al., 1982: 12 (cited Eger). Anderson and Webster, 1983: 3 (San Joaquín, Totai). Anderson, 1985b: 8 (name in list). Anderson, 1993: 26 (general distributional records).

Eumops perotis trumbulli: Anderson et al., 1982: 12 (specimens from San Joaquín and Totai).

Eumops dabbenei: Anderson, 1993: 26 (misidentified specimen from Espíritu, Beni). Aguirre, 1994: 63 (same specimen). Aguirre and Urioste, 1994: 74 (same specimen).

LOCALITIES (3) AND SPECIMENS (42): **Beni:** 1304/6449, San Joaquín, 21 FM (not all seen); 1313/6451, Totai, an estancia 20 km S of San Joaquín, 19 FM; 1413/6640, Espíritu, 1 IE. **Department unknown:** 1 BM, collected by Bridges, probably from southeastern Bolivia (Eger, 1977: 51).

Measurements in tables 8 and 9 are of specimens from Totai (FM 116700—116717, in part).

Eumops perotis trumbulli (Thomas), 1901

Eumops trumbulli: Eger, 1977: 54 (Guayaramarin).

Eumops perotis trumbulli: Koopman, 1978: 22 (first use of name combination, in the form *E. p. trumbulli*). Anderson et al., 1982, p. 12.. Anderson, 1985: 8 (name in list). Anderson, 1993: 26 (general distributional records).

LOCALITIES (3) AND SPECIMENS (10): **Beni:** 1049/6525, Guayaramarin, 4 AM; 1301/6503, Providencia, 5 FM; coordinates unknown, Las Pavas, 1 FM.

Measurements in tables 8 and 9 are of specimens from Guayaramarin (AM 209901, 209902).

Genus *Molossops* Peters, 1865

In addition to the species treated below, *Molossops mattogrossensis* may occur in the Chaco of Bolivia. It is known, as the name implies, from the Brazilian Matto Grosso. Peterson (1965: 3) proposed a separate genus, *Neoplatymops*, for this species. A subgenus, *Cynomops*, has been recognized for *M. abrasus* and *M. planirostris*, and the subgenera *Neoplatymops* and *Molossops* for *M. mattogrossensis* and *M. temminckii*, respectively. Other species of *Molossops*, not occurring in Bolivia, are not discussed here.

Dental formula i1/1–2, c1/1, p1–2/2, m3/3, total 26 to 30. "No anterior palatal emargination. Last upper molar variably developed. Ears relatively short, erect, and usually well separated. Basisphenoid pits usually absent or poorly developed. Wrinkles on upper lip absent or poorly developed. Wing tips of variable breadth" (Koopman, 1994: 137).

Molossops abrasus (Temminck), 1826 *in* 1824–1841

TAXONOMIC REMARKS: Sometimes placed in the subgenus *Cynomops*. The name used for Bolivian specimens has its type locality outside of Bolivia. *Dysopes abrasus* was described by Temminck (1826 *in* 1824–1841: 232), type locality "Brazil." Carter and Dolan (1978: 84) used the name *Molossops abrasus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size relatively large (forearm length, 41–46 mm)" (Koopman, 1994: 137). Measurements in tables 8 and 9 are from Ibáñez (1985).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 610.

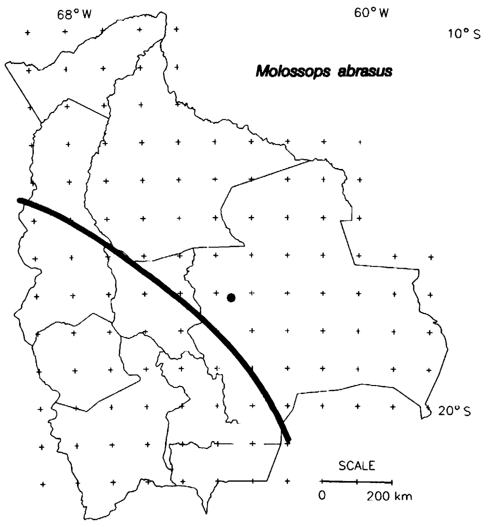


Fig. 610. Localities of known occurrence of *Molossops abrasus.*

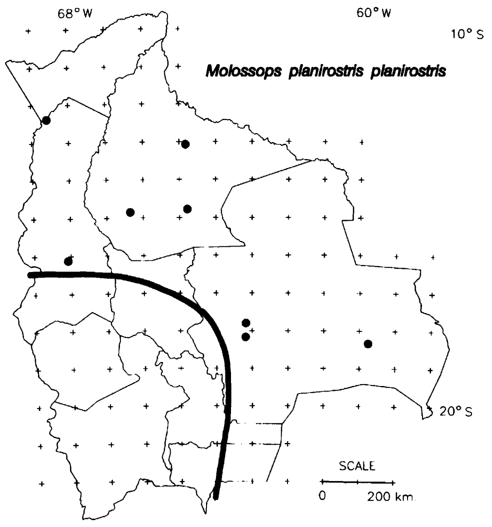


Fig. 611. Localities of known occurrence of *Molossops planirostris planirostris.*

No detailed Bolivian data are available on habitat, habits, behavior, food, and reproduction.

Scientific synonyms used for Bolivian specimens are:

Molossops abrasus: Ibáñez, 1985: 331 (1708/6335). Eisenberg, 1989: 203 (undocumented mention of Bolivia). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Anderson, 1993: 26 (cited Ibáñez).

Molossops (*Cynomops*) *abrasus*: Koopman *in* Wilson and Reeder, 1993: 234 (use of subgenus).

Specimen (1). **Santa Cruz:** 1707/6335, Santa Rosa de Sara, 1 EBD (reported as from 1708/6335, 5 km S of Santa Rosa de Sara by Ibáñez, 1985).

Molossops planirostris (Peters), 1865

TAXONOMIC REMARKS: Sometimes placed in the subgenus *Cynomops*. The name used for Bolivian specimens has its type locality outside of Bolivia; *M*[*olossus* (*Molossops*)]. *planirostris* was described by Peters (1866: 575) on the basis of three specimens from South America. The type locality was restricted to British Guiana (the first locality mentioned by Peters) by several authors (Cabrera, 1958: 119; Hall and Kelson, 1959: 204, Husson, 1962: 231). A lectotype was designated by Carter and Dolan (1978: 86) from Cayenne, French Guiana, which is thus the type locality under the International Code of Zoological Nomenclature (Art. 74(a)iii; International Commission on Zoological Nomenclature, 1985). Miller (1907: 248) first used the name combination *Molossops planirostris*. Koopman (1994: 137) noted that "populations from south of the Amazon basin have not been allocated subspecifically." The use here of the nominate subspecies name for Bolivian specimens needs to be reconsidered on the basis of more detailed study over the entire range of the species.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size relatively small (forearm length, 29–34)" (Koopman, 1994: 137). Measurements in tables 8 and 9 are of specimens from Roboré (AM 260261) and near Ingeniero Mora (MSU 31015–31026, in part).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 611.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Molossops planirostris planirostris (Peters), 1865

Molossops planirostris: Anderson et al., 1982: 11. Myers and Wetzel, 1983: 25 (San Joaquín, Santa Cruz at SE end of airport, 10 km by road E of Ingeniero Mora).

Molossops planirostris planirostris: Anderson, 1985b: 8 (name in list). Anderson, 1993: 26 (general distributional records).

Molossops planiristris: Sawada and Harada, 1986: 368 (Chivé).

Molossops (*Cynomops*) *planirostris*: Koopman *in* Wilson and Reeder, 1993: 235 (use of subgenus).

LOCALITIES (8) AND SPECIMENS (25): **Beni:** 1304/6449, San Joaquín, 2 FM; 1447/6447, Trinidad, 1 CBF (owl pellet); 1451/6621, El Porvenir, 1 EBD. **La Paz:** 1607/6805, 0.5 km E of Saynani, 1 CBF. **Pando:** 1223/6835, Chivé, 1 (Sawada and Harada, 1986: 369). **Santa Cruz:** 1748/6310, Santa Cruz at SE end of airport, 1 MSU (Myers and Wetzel, 1983); 1810/6311, 10 km E of Ingeniero Mora, 17 MSU (12 not seen); 1820/5945, Roboré, 1 AM.

Molossops temminckii (Burmeister), 1854

TAXONOMIC REMARKS: Sometimes placed in the subgenus *Molossops*. The name used for Bolivian specimens has its type locality outside of Bolivia. *Dysopes Temminckii* was described by Burmeister (1854: 72), type locality Lagoa Santa, Minas Gerais, Brazil. Cabrera (1930: 438) first used the name combination *Molossops temminckii temminckii*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size relatively small (forearm length, 25–32 mm). Last upper molar considerably reduced. Sagittal crest poorly developed" (Koopman, 1994: 138). Measurements in tables 8 and 9 are of specimens from San Juan (FM 115814), San Joaquín (FM 115815–115819), Roboré (AM 260262, 260263), 2119/6325 (AM 246652), 1315/6449 (AM 211254), and 1757/6432 (AM 263286).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 612.

No detailed Bolivian data are available on habitat, habits, or behavior.

FOOD: One stomach from Espíritu, Beni (Aguirre, 1994: 83), contained Orthoptera (Grillidae), Hemiptera (not identified to family), Homoptera (of two families), Coleoptera (of at least five families), Lepidoptera, and Diptera (Nematocera). Six measureable prey items were all less than 10 mm in length (Aguirre, 1994: 87).

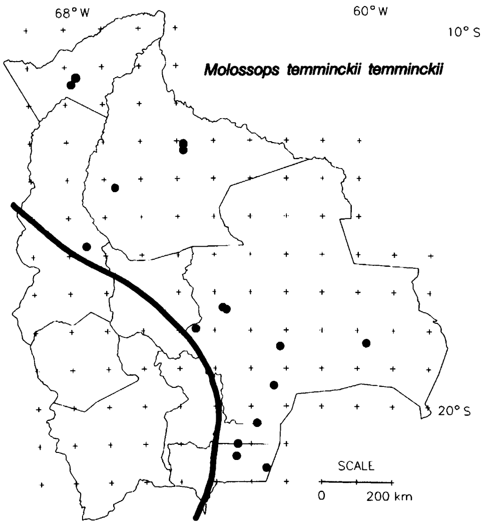


Fig. 612. Localities of known occurrence of *Molossops temminckii temminckii.*

REPRODUCTION: Two pregnant females with single embryos were taken in September.

Scientific synonyms used for Bolivian specimens are:

Molossops temminckii temminckii (Burmeister), 1854

Molossops temminckii temminckii: Anderson et al., 1982: 11. Myers and Wetzel, 1983: 25 (San Joaquín, río Yapacaní, and 8 km S and 10 km E of Villa Montes).

Molossops temmincki temmincki: Anderson, 1985b: 8 (name in list). Anderson, 1993: 26 (general distributional records). Anderson et al., 1993: 29 (vicinity of Santa Cruz de la Sierra).

Molossops temminckii: Eisenberg, 1989: 205 (mentioned "Amazonian Bolivia").

Molossops (*Molossops*) *temminckii*: Koopman *in* Wilson and Reeder, 1993: 235 (use of subgenus).

Molossops temmincki: Aguirre, 1994: 62 (two localities near Espíritu). Aguirre and Urioste, 1994: 74 (Arroyo Hermoso).

LOCALITIES (17) AND SPECIMENS (59):

Beni: 1304/6449, San Joaquín, 5 FM; 1306/6449, San Juan, 1 FM; 1315/6449, 20 km S of San Joaquín, 2 AM; 1413/6640, two localities near Espíritu, 3 (Aguirre, 1994: 66). **La Paz:** 1545/6731, 2 CBF. **Pando:** 1113/6742, Arroyo Hermoso, 3 (Aguirre and Urioste, 1994: 74); 1128/6750, 15 km NO de [= NW of] Puerto Camacho, 4 CBF. **Santa Cruz:** 1724/6346, 25 km by road W of Buenavista, on west bank of río Yapacaní, 1 UMMZ; 1727/6340, Buena Vista, 1 MACN; 1757/6432, 5 km SW of Comarapa, 1 AM; 1820/5945, Roboré, 2 AM; 1825/6210, Tita, 1 AM, 1 MSB; 1927/6221, Cerro Colorado, 5 EBD; 2027/6250, 53 km E of Boyuibe, 2 MSB. **Tarija:** 2100/6323, 1 km S of Camatindi, 3 MSB; 2119/6325, 8 km S and 10 km E of Villa Montes, 1 AM; 2138/6234, Estancia Bolivar, 16 AM, 5 CBF.

Genus *Molossus* É. Geoffroy Saint-Hilaire, 1805

Dental formula, i1/1, c1/1, p1/2, m3/3, total 26. "Anterior palatal emargination absent. Last upper molar greatly reduced. Ears fairly large, with considerable slouch, barely joined. Basisphenoid pits of moderate depth .... Upper incisors greatly shortened and broadened" (Koopman, 1994: 144). Lip furrows absent.

Molossus molossus (Pallas), 1766

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Molossus molossus* was described by Pallas (1766: 49), type locality Martinique, Lesser Antilles. *Molossus crassicaudatus* was described by É. Geoffroy Saint-Hilaire (1805: 156); type locality Paraguay restricted to Asunción by Cabrera (1958: 131). *Molossus velox* was described by Temminck (1826 *in* 1824–1841: 234), type locality "Brésil." Dolan (1989), in her revision of Middle American *Molossus*, did not study South American populations of *M. molossus* in detail. Nor did she deal with subspecific taxonomy or nomenclature. Until this whole situation is studied, the present use of names should be regarded as quite tentative.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size relatively small (forearm length, 33–41 mm). Dorsal hairs with pale bases" (Koopman, 1994: 144). Measurements in tables 8 and 9 are of specimens from Roboré (AM 260277–260296) and Puerto More (211290–211295, 211297, 211307, 211313, 211324, 211357, 21359–21363, 211365–211366).

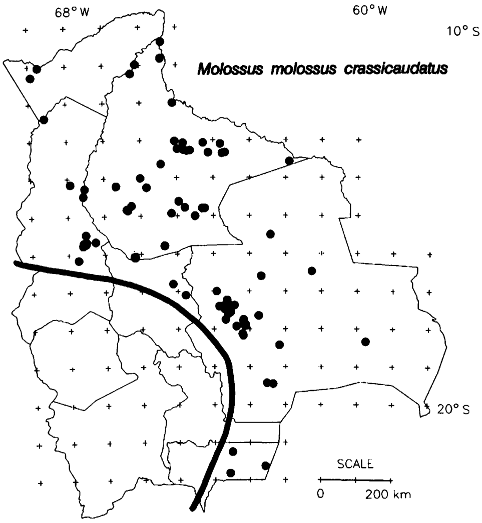


Fig. 613. Localities of known occurrence of *Molossus molossus crassicaudatus*.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 613.

HABITAT: Roosting sites in hollow trees and among palm fronds were reported near Espíritu (Aguirre, 1994: 96). Some sites were shared with *Molossus rufus* or *Noctilio albiventris*. Thatched roofs are favored roosting sites (personal observations at various sites).

HABITS AND BEHAVIOR: In a study during the first 6 hours of darkness near Espíritu, Beni (Aguirre, 1994: 89), two bats of this species were netted between the hours of 1800 and 2000 and one between 2000 and 2200.

PARASITOLOGY: The flea *Rhynchopsyllus pulex* was reported from Santa Cruz de la Sierra (Hopkins and Rothschild, 1953: 68).

FOOD: Four stomachs from Espíritu, Beni (Aguirre, 1994: 83), contained Zygoptera, Orthoptera (Grillidae), Hemiptera (not identified to family), Homoptera (of at least two families), Coleoptera (of at least four families), and Diptera (Nematocera), and Hymenoptera (Formicidae). The five measureable food items were in the 5 to 25-mm range in length (Aguirre, 1994: 87).

REPRODUCTION: Pregnant females (16) with single embryos were taken in August (6), September (9), and November (1). One lactating female was recorded in July.

Scientific synonyms used for Bolivian specimens are:

Molossus molossus crassicaudatus
É. Geoffroy Saint-Hilaire, 1805

Molossus moxensis d'Orbigny, 1837 (according to Sherborn and Griffin, 1934: 130, but dated by d'Orbigny and Gervais, 1847: 12, as 1836, plate 11, figs. 1–4; type locality "Moxos," Bolivia).

Molossus velox: D'Orbigny and Gervais, 1847: 12 (from Moxos and Guarayos).

Dysopes velox: Wagner *in* Schreber, 1855: 712 (Bolivia).

Molossus rufus Var. α (*Molossus obscurus*): Dobson, 1878: 413 (Bolivia, three skins).

Molossus obscurus: Thomas, 1898b: 2 (Caiza). Osgood, 1916: 213 (Trinidad and Todos Santos). Hopkins and Rothschild, 1953: 68 (fleas from Santa Cruz de la Sierra).

Molossops brachymeles: Sanborn, 1932a: 182 (Villa Bella).

Molossus molossus crassicaudatus: Husson, 1962: 259 (conditional first use of name combination, in the form *M. molossus crassicaudatus*). Anderson et al., 1982: 12. Anderson and Webster, 1983: 3 (río Nareuda, Tumichucua). Myers and Wetzel, 1983: 36 (eight places in Beni and Santa Cruz). Barquez, 1983a: 169 (7 km N of Santa Rosa). Webster and Fugler, 1984: 18 (Tumi Chucua, Caranavi, Tomonoco). Anderson, 1985b: 8 (name in list). Anderson, 1993: 27 (general distributional records). Anderson et al., 1993: 30 (vicinity of Santa Cruz de la Sierra).

Mollossus obscurus: Arce Pereira et al., 1963: 152 (name in list; Todos Santos).

Molossus molossus: Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Sawada and Harada, 1986: 368 (Buenavista, Cobija, and Chivé). Ibáñez and Ochoa, 1989: 219 (Guirapenbi). Wilson and Salazar, 1990: 53 (Estación Biológica del Beni). Aguirre, 1994: 64 (four localities near Espíritu).

Molossus crassicaudatus: Hershkovitz, 1987b: 74 (Moxos and Chiquitos).

LOCALITIES (90) AND SPECIMENS (1839): **Beni:** 1023/6524, Villa Bella, 1 CM; 1049/6525, Guayaramarin, 1 AM; 1059/6606, Riberalta, 1 US; 1113/6614, Tumichucua, 5 LSU; 1200/6506, Puerto Moré, 104 AM; 1301/6503, Providencia, 85 FM; 1304/6416, Acapulco, 1 FM; 1304/6449, San Joaquín, 413 FMH; 1306/6348, Buenavista, 2 FM; coordinates unknown, Centenela, 52 FM; 1314/6459, Yuatre, 22 FM; 1315/6449, Yutiole, 19 AM; 1316/6438, San Ramón, 11 MSB; 1317/6443, San Ramón, 2 FM; 1320/6340, Estancia La Cruz, 2 MNLP; 1320/6408, Magdalena, province of Iténez, 7 AM, 13 FM, 61 US; 1321/6345, El Mojon, 20 FM; 1334/6154, Remansos, 1 km below mouth of río Paragua, 3 AM; 1338/6526, río Yacuma, 4 km from mouth, 72 AM; 1400/6600, Nuevo Mundo, Yacuma, 1 EBD; 1411/6639, 1413/6639, 1413/6640, all near Espíritu, 16 IE, 3 MNLP (and 6 from 4 localities, Aguirre, 1994: 66); 1415/6550, Venecia, 22 EBD; 1416/6732, río Beni, 2 MSB; 1428/6734, Rurrenabaque, 19 AM, 2 IE, 3 US; 1437/6457, mouth of río Ibare, 3 AM; 1444/6615, Campamento 08, 1 MNLP; 1447/6447, Trinidad, 4 AM, 1 CBF (owl pellet), 3 FM; 1448/6414, Casarabe, 29 AM, 10 MSB; 1448/6418, Ibiato, 1 CBF; 1450/6622, Estancia Tajibos, 4 EBD, 1 MNLP; 1450/6623, 5 km N of Porvenir, 2 MNLP; 1451/6621, Estación Biológica del Beni, 16 AM, 19 IE, 19 MNLP, 35 MSB, 1 US; 1451/6621, El Porvenir, 3 CBF, 2 EBD; 1456/6509, río Tijamuchi, 3 AM, 5 MSB; 1500/6430, San Andrés, 10 FM; coordinates unknown, Las Pavas, 6 FM; coordinates unknown, río Blanco, 2 CBF; 1545/6523, Puerto San Lorenzo, 1 CBF; 1602/6610, Oromomo, 2 CBF. **Cochabamba:** 1648/6508, Todos Santos, 1 FM; 1706/6447, Sajta, 8 AM, 6 CBF, 6 MSB; coordinates unknown, Campamento II (Univ. Cochabamba), 6 MNK. **La Paz:** 1409/6755, Tumupasa, 2 US; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 6 MSU, 7 TTU; 1540/6715, Huachi, 2 US; 1541/6730, Serranía Bella Vista, 1525 m, 1 AM; 1542/6735, 20 km by road NNE of Caranavi, 1 UMMZ; 1544/6731, La Reserva, 840 m, 8 AM, 6 CBF, 6 MSB; 1546/6736, Caranavi, 1 MSU; 1609/6744, Chijchijpa, 1224 m, 2 AM, 2 CBF, 2 MSB. **Pando:** 1102/6844, Cobija, 1 MNLP, 17 (Sawada and Harada, 1986: 369); 1117/6855, río Nareuda, 1 AM; 1223/6835, Chivé, 1 (Sawada and Harada, 1986: 369). **Santa Cruz:** 1530/6225, Puerto Almacen, 6

MNK; 1628/6116, Esperanza, near Concepción, 2 BM (one not seen); 1636/6241, La Laguna, 5 EBD; 1700/6355, Ayacucho, 46 AM, 1 MNK; 1722/6325, 7 km N of Santa Rosa, in province of Sara, 19 AM, 3 CM, 58 (Barquez, 1983a); 1722/6325, province of Sara, 2 CM; 1714/6338, 4.5 km N of Buen Retiro, 2 AM, 2 MSB; 1722/6325, río Dolores, province of Sara, 1 CM; 1723/6332, San Miguel Rincón, 2 AM; 1724/6345, San Carlos, 1 MNK (not seen); 1724/6351, río Surutú, 2 AM; 1727/6340, Buenavista, province of Sara, 3 AM, 17 CM, 15 FM, 5 BM (not all seen), 11 (Sawada and Harada, 1986: 368), 3 MACN (not seen); coordinates unknown, Barrio Magisterio, 1 MNK; 1728/6342, 4 km SW of Buena Vista, 26 MSB; 1733/6332, 2 km S of Caranda, 22 MSB; 1736/6336, San Rafael de Amboró, 2 AM, 2 MSB; 1739/6245, 3.5 km W of Estación Pailón, 1 AM; 1745/6310, Km 3.5 on road N of Santa Cruz de la Sierra, 1 MNK; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 1 AM; 1748/6310, Santa Cruz de la Sierra, 1 MACN (not seen), 3 from owl pellets in La Paz; 1748/6310, Santa Cruz de la Sierra, campus UAGRM, 1 MNK; coordinates unknown, Nueva Moka, 5 MACN (not seen); 1748/6310, Santa Cruz [de la Sierra], 5 AM, 1 BM, 15 MSU; 1753/6307, Las Lomitas, 15 km S of Santa Cruz, 12 AM, 4 MNK, 8 MSB; 1755/6308, 15 km S of Santa Cruz, 1 MSB; coordinates unknown, San Miguel, province of Chiquitos, 2 CBF; 1756/6322, San José, 3 MNK (2 not seen); 1808/6312, 7 km E of Ingeniero Mora, 2 AM; 1810/6311, 10 km E of Ingeniero Mora, 212 MSU; 1820/5945, Roboré, 25 AM, 5 MSB; 1825/6210, Tita, 1 AM; 1927/6221, Cerro Colorado, 16 EBD; 1926/6231, Guirapembi, 2 EBD. **Tarija:** 2115/6330, Villa Montes, 3 Frankfurt (Felten, in litt.); 2138/6234, Estancia Bolívar, 2 AM, 1 CBF; 2149/6334, Caiza, 1 (Thomas, 1898b). **Department unknown:** Bolivia, 1 MACN (not seen); "Bolivia" only, 4 BM.

Molossus rufus
É. Geoffroy Saint-Hilaire, 1805

Black Mastiff Bat

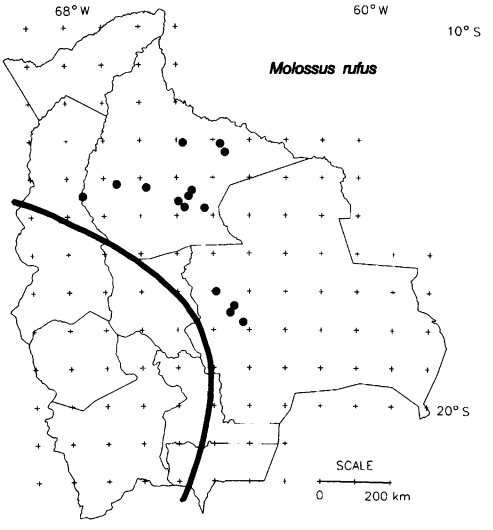


Fig. 614. Localities of known occurrence of *Molossus rufus*.

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Molossus rufus* was described by É. Geoffroy Saint-Hilaire (1805: 155); type locality restricted by Miller (1913: 88) to Cayenne, French Guiana.

Morphological Characters and Comparisons: "Size relatively large (forearm length, 47–53 mm). Dorsal hairs with dark bases" (Koopman, 1994: 144). Measurements in tables 8 and 9 are of specimens from Casarabe (AM 261852–261855), the mouth of the río Ibare (AM 211279), and Ayacucho (AM 263285).

Distributional Notes: Known localities are listed below and mapped in figure 614.

Habitat: A roosting site among palm fronds was reported near Espíritu (Aguirre, 1994: 96). The site was shared with *Molossus molossus*.

Habits and Behavior: In a study during the first 6 hours of darkness near Espíritu, Beni (Aguirre, 1994: 89), four bats of this species were netted between the hours of 1800 and 2000 and one between 2000 and 2200.

Food: Five stomachs from Espíritu, Beni (Aguirre, 1994: 83), contained Zygoptera, Orthoptera (Grillidae), Hemiptera (Belostomidae), and Coleoptera (of at least four families). The six measureable food items varied in size from less than 5 to more than 20 mm (Aguirre, 1994: 87).

REPRODUCTION: One pregnant female with single embryo was taken in November.

Scientific synonyms used for Bolivian specimens are:

Molossus rufus: Gerrard, 1862: 52 (two Bolivian skulls from the Bridges collection). Alston, 1879: 31 (Bolivia). Trouessart, 1904: 101 (Bolivia). Dolan, 1989: 46 (use of name *rufus* rather than *ater*). Anderson, 1993: 27 (general distributional records). Anderson et al., 1993: 30 (vicinity of Santa Cruz de la Sierra).

Molossus ater: Myers and Wetzel, 1983: 35 (San Joaquín, Buenavista). Cabot et al., 1986: 42 (name in list for Estación Biológica del Beni). Barquez and Ojeda, 1992: 253 (mention Beni specimens). Aguirre, 1994: 64 (three localities near Espíritu).

Molossus ater ater: Anderson et al., 1982: 12. Anderson, 1985b: 8 (name in list).

LOCALITIES (17) AND SPECIMENS (67): **Beni:** 1304/6449, San Joaquín, 28 FM (not all seen); 1306/6348, Buenavista, 1 FM; 1320/6340, Estancia La Cruz, 6 MNLP; 1410/6639, 1411/6638, 1413/6640, three localities near Espíritu, 9 (Aguirre, 1994: 66); 1415/6550, Venecia, 2 EBD; 1420/6435, Santa Rosa, río Cucharca, 4 IML; 1428/6734, Rurrenabaque, 1 US; 1429/6440, San Juan, 1 IML; 1437/6457, mouth of río Ibare, 1 AM; 1447/6447, Trinidad, 3 MSU (not seen); 1448/6414, Casarabe, 4 AM; coordinates unknown, río Blanco, 1 MNLP. **Cochabamba:** coordinates unknown, Campamento II (Univ. Cochabamba), 1 MNK. **Santa Cruz:** 1700/6355, Ayacucho, 1 AM; 1722/6325, 7 km N of Santa Rosa, in province of Sara, 1 AM; 1733/6332, 2 km S of Caranda, 2 MSB; 1748/6310, Santa Cruz de la Sierra, 1 IML.

Genus *Nyctinomops* Miller, 1902

Three of four species are known from Bolivia.

Dental formula i1/2, c1/1, p2/2, m3/3, total 30. "Anterior palatal emargination well developed but narrow. Last upper molar not reduced. Ears fairly large with considerable slouch, usually well joined. Basisphenoid pits always present but variable as to depth" (Koopman, 1994: 142).

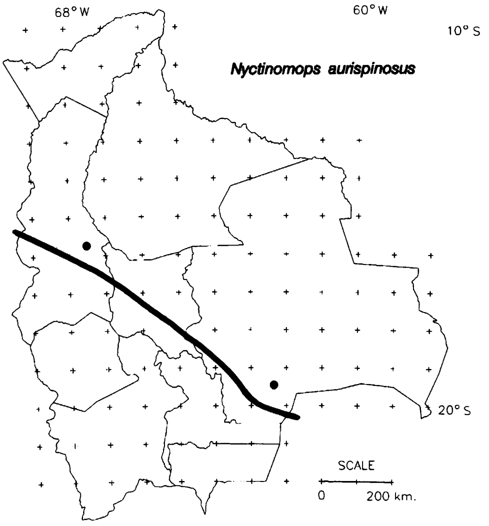


Fig. 615. Localities of known occurrence of *Nyctinomops aurispinosus*.

Nyctinomops aurispinosus (Peale, 1848)

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Dysopes aurispinosus* was described by Peale (1848: 21), type locality "about one hundred miles from land, south of Cape St. Roque," Brasil, flew on board the U.S.S. *Peacock*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Ears well joined. Basisphenoid pits of medium depth. Size medium (forearm length, 47–52 mm)" (Koopman, 1994: 142). Measurements in tables 8 and 9 are of a specimen (AM 244353) from Sinaloa, Mexico.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 615.

No detailed Bolivian data are available on habitat, habits, behavior, and food.

REPRODUCTION: Four females taken in September had single embryos.

Scientific synonym used for Bolivian specimens is:

Nyctinomops aurispinosus: Ibáñez and Ochoa, 1989: 217 (Hacienda Cerro Colorado). Jones and Arroyo-Cabrales, 1990: 1 (general information on the species). Anderson, 1993: 26 (cited Ibáñez and Ochoa).

LOCALITIES (3) AND SPECIMENS (10): **Cochabamba:** coordinates unknown, Campa-

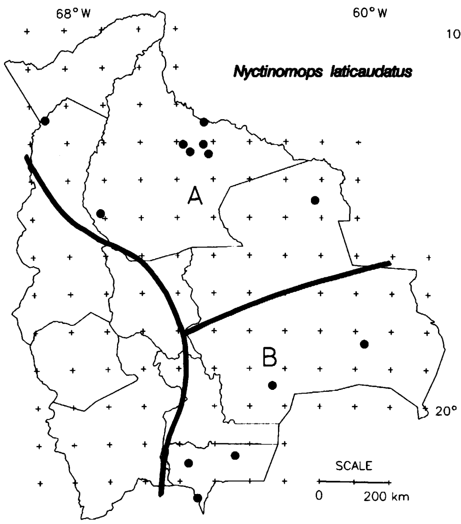


Fig. 616. Localities of known occurrence of two subspecies of *Nyctinomops laticaudatus*, *N. l. europs* (A) and *N. l. laticaudatus* (B).

mento II, 1 MNK. **La Paz:** 1544/6731, La Reserva, 840 m elevation, 1 MSB. **Santa Cruz:** 1927/6221, Hacienda Cerro Colorado, 8 EBD.

Nyctinomops laticaudatus (É. Geoffroy Saint-Hilaire), 1805

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Molossus laticaudatus* was described by É. Geoffroy Saint-Hilaire (1805: 156), type locality Paraguay, restricted to "Asunción" by Cabrera (1958: 121). *Nyctinomus europs* was described by H. Allen (1889: 558); type locality "Brazil" restricted to "Corumbá, estado de Mato-Grosso," Brazil, by Cabrera (1958: 121). Silva-Taboada and Koopman (1964: 3) used the name *Tadarida laticaudata europs*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Ears well joined. Anterior upper premolar somewhat reduced. Upper lip wrinkles relatively numerous. Size relatively small (forearm length, 39–47 mm)" (Koopman, 1994: 142).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 616.

No detailed Bolivian data are available on habitat, habits, behavior, and food.

REPRODUCTION: One female of *N. l. europs* taken in September had a single embryo.

Scientific synonyms used for Bolivian specimens are given under the subspecies below.

Nyctinomops laticaudatus europs Allen, 1899

Nyctinomops laticaudata europs: Anderson et al., 1982: 11. Anderson and Webster, 1983: 3 (Coroico). Anderson, 1985b: 8 (name in list); 1991: 143 (1223/6835). Anderson, 1993: 26 (general distributional records). Ibáñez et al., 1994: 80 (first specimen from Santa Cruz).

Tadarida laticaudata: Myers and Wetzel, 1983: 33 (Magdalena).

LOCALITIES (8) AND SPECIMENS (46): **Beni:** 1229/6415, 4 km above Costa Marques [Brazil], on río Iténez, 1 AM; 1304/6416, Acapulco, 1 FM; 1304/6449, San Joaquín, 5 FM; 1316/6438, San Ramón, 9 MSB; 1320/6408, Magdalena, 14 AM, 13 FM; 1452/6707, Km 35, NW of Yucumo, 1 MSB. **Pando:** 1223/6835, Isla Gargantua, 1 AM. **Santa Cruz:** 1433/6111, Aserradero Moira, 1 EBD.

Measurements in tables 8 and 9 are of a specimen (AM 209774) from 4 km above Costa Marques.

Nyctinomops laticaudatus laticaudatus (É. Geoffroy Saint-Hilaire), 1805

Tadarida laticaudata: Myers and Wetzel, 1983: 33 (8 km S and 10 km E of Villa Montes).

Nyctinomops laticaudatus: Vaccaro, 1990: 79 (río Bermejo). Specimens, 50.

Nyctinomops laticaudatus laticaudatus: Anderson, 1991: 143 (1820/5945, 2119/6325). Anderson, 1993: 26 (general distributional records).

LOCALITIES (5) AND SPECIMENS (84): **Santa Cruz:** 1820/5945, Roboré, 8 AM, 5 MSB; 1927/6221, Cerro Colorado, 34 EBD. **Tarija:** 2119/6325, 8 km S and 10 km E of Villa Montes, 1 AM; 2131/6445, Tarija (assumed to be the city), 18 MACN (not seen); 2227/6430, left bank of río Bermejo opposite mouth of río Lipeo, 18 (Vaccaro, 1990: 79).

Measurements in tables 8 and 9 are of specimens from Roboré (AM 260265—260272, MSB 55199–55203) and 8 km S and 10 km E of Villa Montes (AM 246653).

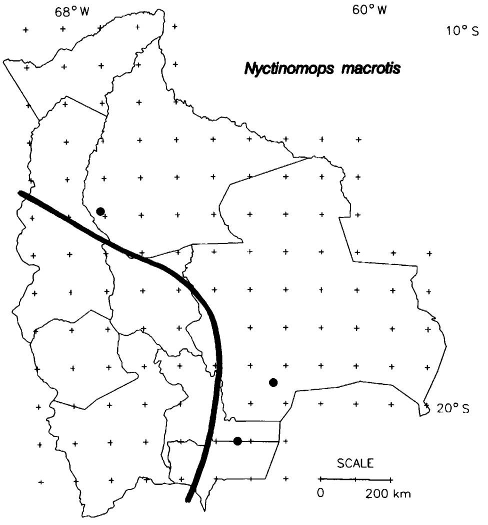


Fig. 617. Localities of known occurrence of *Nyctinomops macrotis*.

Nyctinomops macrotis (Gray), 1839

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Nyctinomus macrotis* was described by Gray (1839: 5), type locality "Cuba."

Morphological Characters and Comparisons: "Ears well joined. Basisphenoid pits relatively deep. Size relatively large (forearm length, 58–64 mm)" (Koopman, 1994: 143). Measurements in tables 8 and 9 are of specimens (AM 173661) from Arizona and from 1 km S of Camatindi (AM 264088).

Distributional Notes: Known localities are listed below and mapped in figure 617.

No detailed Bolivian data are available on habitat, habits, behavior, food, and reproduction.

Scientific synonym used for Bolivian specimens is:

Nyctinomops macrotis: Ibáñez and Ochoa, 1989: 216 (Hacienda Cerro Colorado). Milner et al., 1990: 1 (general information on the species). Anderson, 1993: 26 (general distributional records).

Localities (3) and Specimens (3): **Beni:** 1452/6707, km [marker] 35, NW of Yucumo, 1 CBF. **Santa Cruz:** 1927/6221, Hacienda Cerro Colorado, 1 EBD. **Tarija:** 2100/6323, 1 km S of Camatindi, 1 AM.

Promops Gervais, *in* Castelnau, 1855

Dental formula i1/2, c1/1, p2/2, m3/3, total 30, but anterior upper premolar greatly reduced. "Anterior palatal emargination absent. Last upper molar greatly reduced. Ears fairly large, with considerable slouch, barely joined. Basisphenoidal pits of moderate depth . . .. Upper incisors not greatly shortened and broadened" (Koopman, 1994: 144). Unusually high domed palate. Both of the living species occur in Bolivia.

Promops centralis Thomas, 1915

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Promops centralis* was described by Thomas (1915: 62), type locality "N. Yucatan, Central America." *Promops occultus* was described by Thomas (1915: 62), type locality "Sapucay" in Paraguay.

Morphological Characters and Comparisons: "Size relatively large (forearm length, 48–56 mm)" (Koopman, 1994: 144). Measurements in tables 8 and 9 are of specimens from Roboré (AM 260273, 260274, MSB 55158).

Distributional Notes: Known localities are listed below and mapped in figure 618.

No detailed Bolivian data are available on habitat, habits, behavior, food, and reproduction.

Scientific synonyms used for Bolivian specimens are:

Promops centralis occultus Thomas, 1915

Promops centralis: Ibáñez and Ochoa, 1989: 219 (Espejillos, Guaripembi). Anderson, 1991: 143 (Roboré).

Promops centralis occultus: Anderson, 1993: 27 (general distributional records). Anderson et al., 1993: 29 (vicinity of Santa Cruz de la Sierra).

Localities (3) and Specimens (5): **Santa Cruz:** 1758/6327, Espejillos, 1 EBD; 1820/5945, Roboré, 2 AM, 1 MSB; 1926/6231, Guirapembi, 1 EBD.

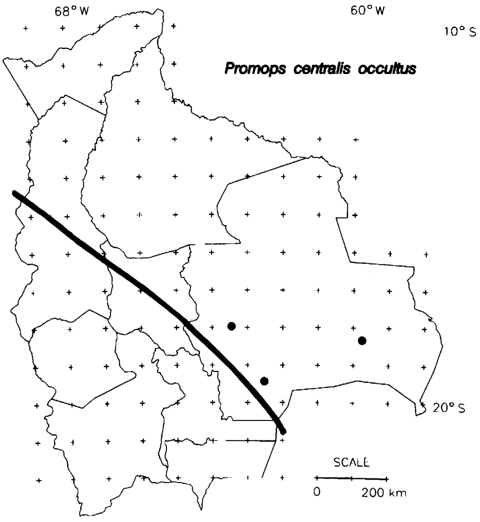


Fig. 618. Localities of known occurrence of *Promops centralis occultus*.

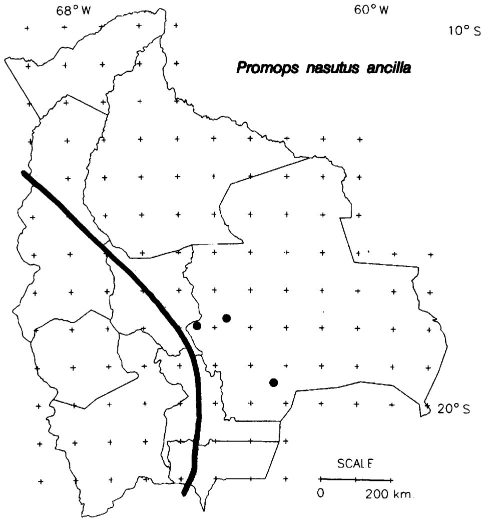


Fig. 619. Localities of known occurrence of *Promops nasutus ancilla*.

Promops nasutus (Spix), 1823

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Molossus nasutus* was described by Spix (1823: 58), type locality Rio São Francisco, Baia, Brazil. *Promops ancilla* was described by Thomas (1915: 63); type locality "Cachi, [province of] Salta. Alt. 2500 m." in Argentina. The source of the name *ancilla* was not noted in the original description. Cabrera (1958: 128) used the name *Promops nasutus ancilla*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Size relatively small (forearm length, 43–50 mm)" (Koopman, 1994: 144). Measurements in tables 8 and 9 are of specimens from 3 km SE of Comarapa (AM 260306) and 4.5 km N and 1.5 km E of Cerro Amboró (AM 261851).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 619.

No detailed Bolivian data are available on habitat, habits, behavior, food, and reproduction.

Scientific synonyms used for Bolivian specimens are:

Promops nasutus ancilla Thomas, 1915

Promops nasutus ancilla: Anderson, 1993: 27 (general distributional records). Anderson et al., 1993: 29 (vicinity of Santa Cruz de la Sierra).

Promops nasutus: Anderson, 1985b: 8 (name in list). Ibáñez and Ochoa, 1989: 219 (Hacienda Cerro Colorado). Eisenberg, 1989: 219 (mentioned Bolivia). Anderson, 1991: 143 (1757/6430 and 1745/6340).

LOCALITIES (3) AND SPECIMENS (4): **Santa Cruz:** 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 1 AM; 1757/6430, 3 km by road SE of Comarapa, 1 AM; 1927/6221, Hacienda Cerro Colorado, 2 EBD.

Genus *Tadarida* Rafinesque, 1814

Dental formula i1/2–3, c1/1, p2/2, m3/3, total 30 or 32. "Anterior palatal emargination well developed. Last upper molar not greatly reduced. Ears fairly large, with some slouch, somewhat separated or almost joined. Basisphenoid pits variably developed. Wing tips variably developed" (Koopman, 1994: 138). Lip furrows present.

Tadarida brasiliensis (I. Geoffroy Saint-Hilaire), 1824

Brazilian Free-tailed Bat

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Nyctinomus Brasiliensis* was described by I. Geoffroy Saint-Hilaire (1824:

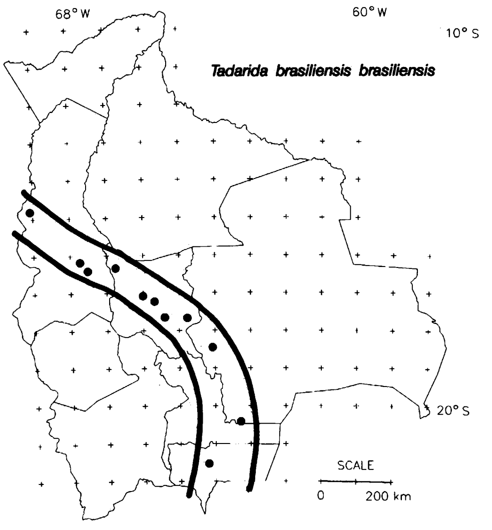


Fig. 620. Localities of known occurrence of *Tadarida brasiliensis brasiliensis*.

337); type locality Brazil, restricted to "Curityba, Province of Parana," Brazil, by Shamel (1931: 4). Thomas (1920c: 222) used the name *Tadarida brasiliensis* and Schwartz (1955: 108) used the name *Tadarida brasiliensis brasiliensis*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: "Ears definitely separate. Basisphenoid pits shallow. Wing tips relatively broad. Outer lower incisor usually present. Anterior upper premolar reduced. Upper lip wrinkles well developed but relatively few in number. Size relatively small (forearm length, 31–47 mm)" (Koopman, 1994: 139). Measurements in tables 8 and 9 are of specimens from Yungas de Cochabamba (CM 5278–5280), Incachaca (BM 34.9.2.30), and Pocona (BM 34.9.2.25 and 26).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 620.

No detailed Bolivian data are available on habitat, habits, behavior, food, and reproduction.

Scientific synonyms used for Bolivian specimens are:

Tadarida brasiliensis brasiliensis
(I. Geoffroy Saint-Hilaire), 1824

Tadarida brasiliensis: Sanborn, 1932a: 182 (Yungas of Cochabamba).

Tadarida brasiliensis brasiliensis: Anderson et al., 1982: 11. Anderson, 1985b: 8 (name in list). Wilkins, 1989: 1 (general information on the species). Anderson, 1993: 26 (general distributional records).

Nyctinomops laticaudata europs: Anderson and Webster, 1983: 3 (Coroico, a misidentification).

LOCALITIES (11) AND SPECIMENS (67): **Cochabamba:** 1620/6645, Yungas, 3 CM; 1705/6600, Tablas Monte, 9 AM, 6 CBF, 6 MSB; 1714/6541, Incachaca, 1 BM; 1739/6524, Pocona, 7 BM; 1740/6446, Calahuasi, 1 IML. **La Paz:** 1610/6744, Coroico, 1 AM; 1624/6731, Chulumani, 2 BM; 1448/6904, Pelechuco, 27 IE. **Santa Cruz:** 1827/6404, 5.5 km by road NNE of Vallegrande (río Cienega), 1 AM, 1 MNK; 2025/6317, Boyuibe, 1 LACM (not seen). **Tarija:** 2132/6412, Entre Ríos, 1 ANSP.

ORDER PRIMATES LINNAEUS, 1758

The measurements for primates in tables 10 and 11 are as follows: total length, length of tail vertebrae, length of hind foot, length of ear from notch, and weight (all from collectors' field measurements), length of skull from nasion (upper margin of nasal aperture) to most distant point on back of skull, length of skull from latter point to most distant point on premaxillary, zygomatic breadth, alveolar length of molariform tooth row, alveolar dental span (between outermost alveolar margins of right and left upper tooth rows), length of mandible from articular process to most distant point of bone anteriorly, mandibular depth from notch above articular process to most distant point on margin of angular process, and mandibular depth from the latter point to most distant point on coronoid process.

In a study of circumorbital foramina, Msuya and Harrison (1994), most of the specimens used were at AMNH, including numbers of Bolivian specimens, but specimens studied were not specifically noted. In their tables, the following species that occur in Bolivia are listed: *Saguinus fuscicollis*, *Alouatta seniculus*, *Ateles paniscus*, *Cebus apella*, and *Saimiri sciureus*.

I follow Groves (*in* Wilson and Reeder, 1993) in arranging families as well as subsidiary units in alphabetical rather than phylogenetic order, although taxa may be placed at different ranks.

FAMILY CALLITRICHIDAE THOMAS, 1903

TAXONOMIC REMARKS: No single family-group name has been universally applied for the marmosets. Both spelling and type genus have been subject to various interpretations. Gray (1821: 298) used the name Callitrichidae to include four species now assigned to the genera *Alouatta*, *Ateles*, *Cebus*, and *Saimiri*, none of which is a marmoset. The family name was based on "*Callitrix*" of Geoffroy [presumably *in* Humboldt, 1812: 357, where the name was spelled *Callithrix*], including *Simia sciurea* of Linnaeus. In any event, the name *Callithrix* was preoccupied by *Callithrix* (Erxleben, 1777: 55), type species *Simia jacchus* Linnaeus, 1758, by subsequent designation by Thomas (1903c: 457). Several nomenclatural problems arising from Geoffroy's primate names were clarified by Thomas (1903c: 457), who wrote that "the family name for the marmosets will be Callitrichidae." Further complications arise when we see that, on the same page, Gray (1821: 298) also used the name Harpaladae based on "*Harpale*" [a misspelling of *Hapale*] of Illiger, including "*Lemur jaccus*" of Linnaeus, which is a marmoset. Groves (*in* Wilson and Reeder, 1993: 251) used "Callitrichidae Gray, 1821," for *Callimico*, *Callithrix* (including *Cebuella*), *Leontopithecus*, and *Saguinus*. Groves wrote that the family name is generally spelled Callithricidae, but that one should see Napier and Napier (1967). Napier and Napier (1967: 346) cited Callitrichidae and Callitrichinae, both from Thomas, 1903. Hill (1957: 115) used Hapalidae Wagner, 1840. Rubio et al. (1991: 14) used the misspelling Callithicidae. For the linguistic basis for use of Callitrichidae instead of Callithricidae, see ICZN (Appendix D, item 24, 1985). The taxonomic history at the familial level was summarized recently by Rylands et al. (1993: 11), who used the name Callitrichidae. In summary, the oldest family-group name based explicitly on a marmoset is Hapalidae (emendation of Harpaladae Gray, 1821). However, Article 40 of the Code (ICZN, 1985) states that "if a family-group name has been replaced before 1961 because [the generic name on which a valid family-group name is based is rejected as a junior synonym] . . ., and the replacement name has won general acceptance, it is to be maintained." I think that Hapalidae was replaced under such circumstances before 1961 and that Callitrichidae has won general acceptance. Because of Gray's misuse of the name, I do not think that he should be cited as the author.

Most Bolivian species of the family Callitrichidae are regarded as threatened (CITES, Appendix II).

SUBFAMILY CALLIMICONINAE THOMAS, 1913

Groves (*in* Wilson and Reeder, 1993: 251) did not recognize this subfamily and included *Callimico* in the Callitrichidae.

Genus *Callimico* Miranda Ribeiro, 1911

Callimico goeldii (Thomas), 1904

Goeldi's Monkey, Mono Negro

TAXONOMIC REMARKS: Considerable uncertainty about the familial level affinities of this genus has existed since its description. The name used for Bolivian specimens has its type locality outside of Bolivia. *Midas Goeldii* was described by Thomas (1904b: 189), type locality "Amazons" (specimen brought alive to Pará).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 10 and 11 are of specimens from the río Nareuda (AM 248726, 248727). Growth was illustrated by Masataka et al. (1978). Photos were published by Mino (1978) and Izawa (1980a: 1).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 621. Reported to occur south to the ríos Orthon and Manuripi in Pando (Izawa, 1979: 1).

HABITAT: "Shabby" forests, usually bamboo, and at forest edges (Izawa, 1979: 7). "A habitat specialist, preferring low-lying and damp, but well-drained, bamboo forest and spending nearly all its time within 3 m of ground level" (Pook and Pook, 1981: 288).

HABITS AND BEHAVIOR: Usually in scattered local groups of five to eight. Often associated with *Saguinus fuscicollis* and *S. labiatus*, both of which are more common and more continuously distributed (Pook and Pook, 1981: 292). In two of eight observations of *Callimico goeldii* by Cameron et al.

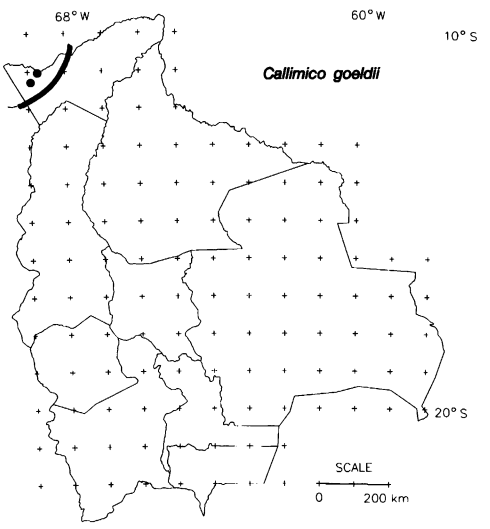


Fig. 621. Localities of known occurrence of *Callimico goeldii.*

(1989: 66), these animals were associated with *Saguinus fuscicollis* and *S. labiatus*. In one of these two cases, *Callicebus* was present also. A group of nine *Callimico* was observed by Izawa and Yoneda (1981: 21). Three were trapped alive at Mucden and used as "bait" to attract others in the group. One adult male, two adult females, and six young made up the total group (Izawa, 1980c). During the period of study, one female left the group and two young were born. The three captives were returned to the group, which then consisted of 10 individuals. This group had a home range of about 40 hectares. In a study, there was about one group per 4 km^2 (Pook and Pook, 1981). Cameron et al. (1989: 64) estimated density of groups to average 1.6 per km^2 and individuals to average 9.6 per km^2. One escape observed by Izawa (1979: 9) was "made in rapid horizontal leaps at a height of about 2 m above the ground." They travel "mainly by vertical clinging and leaping" (Pook and Pook, 1981). "A loud and distinctive feeding call" was reported (Pook and Pook, 1981: 303). Other vocalizations were at high frequencies, above 20 kH and inaudible to human ears (Masataka, 1980). When a tape recording was played at half speed, the sounds were audible. In a small group at a feeding station, a hierarchy was observable in regard to which individuals had first access to the food.

FOOD: "The most common object of foraging was insect food" (Pook and Pook (1981). A variety of fruits and exuded gums are eaten also.

REPRODUCTION: "Give birth to single offspring and are fully mature by the age of 18 months" (Pook and Pook, 1981: 292). Masataka (1980) reported the following: Two females gave birth in September and October and were sexually receptive to males some 7 to 10 days later. Gestation is about 150–180 days. Weaning occurs about 20 days after birth. At about 2 months the babies started to play together.

CONSERVATION STATUS: Regarded as an endangered species (CITES, Appendix I; Bejarano, 1982: 261).

Scientific synonyms used for Bolivian specimens are:

Callimico goeldii: Pocock, 1920: 92 (from "Ma," perhaps Ina, River, Bolivia). Izawa, 1977c, 1978a, 1978b, 1979 (observations in Pando). Heltne et al., 1976: table 2 ("reliable reports" at Cobija). Pook and Pook, 1979, 1981, 1982 (observations in Pando). Bejarano, 1980: 693 (general map). Izawa, 1980a, 1980b, and 1980c (observations in Pando, under vernacular name only). Izawa and Bejarano, 1981: 9 (observations in Pando). Izawa and Yoneda, 1981: 13 (observations in Pando). Masataka, 1981a, 1981b. Freese et al., 1982: 68 (observations in Pando). Tello, 1986: 17 (observed on Manuripi River "about 10 km west of San Silvestre." Brown and Rumiz, 1986: 339 (Pando). Eisenberg, 1989: 239 (mentioned the Bolivian studies by Pook and Pook). Cameron et al, 1989: 64 (observations in Pando). Tarifa, 1991: 74 (name in list, summary of status).

Callimico goeldi: Anderson, 1985b: 9 (name in list). Emmons and Feer, 1990: 108 (mentioned Bolivia). Ergueta and Salazar, 1991: 18 (general summary). Anderson, 1993: 28 (two localities in Pando).

LOCALITIES (2) AND SPECIMENS (3): **Pando:** 1102/6844, Cobija, 1 São Paulo (Vanzolini, in litt.); 1117/6855, río Nareuda, 2 AM.

SUBFAMILY CALLITRICHINAE GRAY, 1821

Genus *Callithrix* Erxleben, 1777

Bejarano (1980: 694) mapped *Callithrix jacchus* in western Pando and it may occur there, but I know of no specimen or other explicit documentation from there. Groves (*in* Wilson and Reeder, 1993: 252) reported *Callithrix kuhlii* (Wied-Neuwied, 1826) as from Bolivia. But this is a mistake; all of the records referred to are in Bahia, Brazil.

Callithrix melanura (É. Geoffroy Saint-Hilaire *in* Humboldt), 1812

White Marmoset

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Jacchus melanurus* was described by É. Geoffroy Saint-Hilaire (*in* Humboldt, 1812: 361), type locality "le Bresil"? restricted to "Cuyubá" (= Cuiabá), Mato Grosso, by Allen, 1916b: 584. *Simia argentata* was described by Linnaeus (1771), type locality Pará, Brazil. Vivo (1991) reviewed the genus and reported no clear evidence of intergradation between *Callithrix melanura* and *C. argentata*. Their geographic ranges are nowhere in contact. He treated them as separate species.

Morphological Characters and Comparisons: Measurements in tables 10 and 11 are of specimens from río Quiser (CM 5011–5013, 5015–5016, FM 44859) and río Mapaiso (CM 1963–1965). Data for Ibiato in table 10 are from W. Townsend (in litt.).

Distributional Notes: Known localities are listed below and mapped in figure 622.

Habitat: The "San José region was forested by dry, scrubby, deciduous forest" (Heltne et al., 1976: 7).

Habits and Behavior: Five troops were observed in the San José region by Heltne et al. (1976: table 3). In table 4, these authors estimated the densities of troops and individuals per square kilometer in favorable habitat to be 1.1 and 5.5, respectively.

No Bolivian data are available on food or reproduction.

Scientific synonyms used for Bolivian specimens are:

Jacchus leucomerus Gray, 1846: 212 (type locality "Bolivia").

Hapale melanura: I. Geoffroy Saint-Hilaire, 1851: 61 (Santa Cruz de la Sierra). Gray, 1866a: 734 ("Bolivia"). Schlegel, 1876: 268 ("Bolivia"). Rode, 1938: 238 (catalogue of types).

Callithrix argentata: Elliot, 1913, vol. 1: 222 ("Bolivia"). Heltne et al., 1976: table 2 (observed at San José de Chiquitos). Bejarano, 1980: 694 (general map). Freese et al., 1982: 68 (seen near San José). Tello, 1986: 16 (observed at Los Palmares, 1545/6100). Natori, 1986: 321 (studied 20 specimens, probably one or two from Bolivia). Emmons and Feer, 1990: 97 (mentioned Bolivia). Wolfheim, 1983: 145 (map, notes on exports). Parker et al., 1993: 46 (seen at the Jardín Botanico near Cotoca).

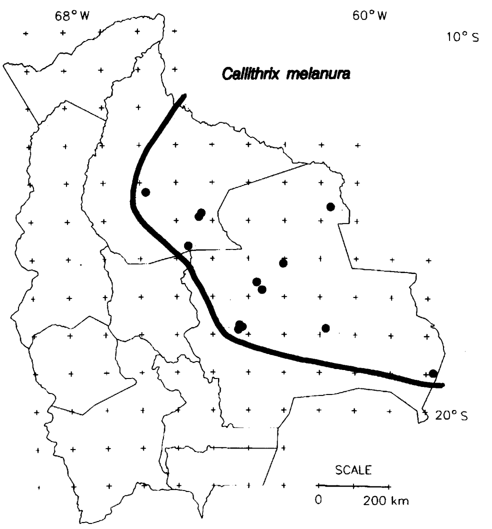


Fig. 622. Localities of known occurrence of *Callithrix melanura*.

Callithrix argentatus melanura: Allen, 1916b: 583 (first use of name combination). Cabrera, 1958: 185. Avila-Pires, 1969: 62. Napier, 1976: 10 ("Bolivia"). Hershkovitz, 1977: 582 (Santa Cruz de la Sierra). Anderson, 1985b: 9 (name in list).

Callithrix melanura: Krieg, 1930: 763 (seen near San José de Chiquitos, photo of four study skins but exact locality not given). Vivo, 1991 (see note under species above).

Mico argentatus melanurus: Hill, 1957: 278.

Callithrix argentatus leucomerus: Hershkovitz, 1977: 583 (río Mapaiso, río Quiser, Palmarito).

Callithrix argentata melanura: McLaren et al., 1984: 495 (río Quiser, Palmarito, río Mapaiso). Vivo, 1985: 105 (Palmarito, río Quiser, Santa Cruz de la Sierra, Puerto Suárez). Brown and Rumiz, 1986: 339 (summary). Braza and García, 1988: 182 (observations in Huanchaca area of northern Santa Cruz). Tarifa, 1991: 74 (name in list, summary of status). Anderson, 1993: 28 (general distributional records). Anderson et al., 1993: 33 (vicinity of Santa Cruz de la Sierra).

Rylands et al., 1993: 31 ("east of the Rio Mamore").

LOCALITIES (13) AND SPECIMENS (31): **Beni:** 1415/6550, Venecia, 1 EBD; 1448/6418, Ibiato, 1 MNK (+1 CBF and 1 MNK not seen, W. Townsend, in litt.); 1454/6422, 6 km W of Casarabe, 1 AM; 1540/6440, río Mamoré, Marbán (province), 2 MACN (not examined). **Santa Cruz:** 1438/6044, 55 km E of Aserradero Moira, 2 EBD; 1608/6202, Concepción, 1 MNLP; 1637/6246, río Quiser, 5 CM, 1 FM; 1649/6237, Palmarito, 2 CM; 1745/6315, Cercado, 1 FM; 1748/6310, Santa Cruz de la Sierra, 1 Paris (I. Geoffroy Saint-Hilaire, 1851), 1 MACN (not examined); 1750/6050, San José de Chiquitos, 3 IML; 1752/6317, río Mapaiso, 4 CM; 1858/5748, Puerto Suárez (Vivo, 1985). **Department unknown:** "Bolivia," 1 MNLP, 2 MACN (not examined).

Genus *Cebuella* Gray, 1866a

Cebuella pygmaea (Spix), 1823

Pygmy Marmoset

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Iaccus pygmaeas* was described by Spix (1823: 32); type locality "Tabatinga ad ripas fluvii, Solimöens," Amazonas, Brazil. See the synonymy below.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 10 and 11 are of specimens from Peru (AM 75280) and Ecuador (AM 182942). I have no measurements for the Bolivian specimen.

DISTRIBUTIONAL NOTES: The only known locality is noted below and mapped in figure 623.

HABITAT: Along rivers in low forest and secondary bamboo forest (Izawa and Bejarano, 1981: 9).

HABITS AND BEHAVIOR: Izawa and Bejarano (1981: 6) reported seven observations of groups in Pando and ranging in size from one to five individuals. Izawa (1977a, 1977b) illustrated some activities.

No Bolivian data are available on food or reproduction.

Scientific synonyms relevant to Bolivian specimens are:

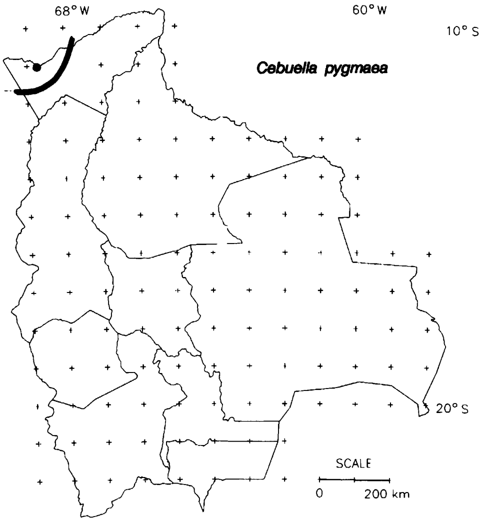


Fig. 623. Locality of known occurrence of *Cebuella pygmaea*.

Cebuella pygmaea: Heltne et al., 1976: 9 ("reliable reports" at Cobija). Izawa, 1979: 13 (photo at río Nareuda). Izawa and Bejarano, 1981: 9 ("between the Rio Acre and the Río Tahuamanu"). Freese et al., 1982: 73 (reported along the río Acre). Wolfheim, 1983: 157 (Cobija, cited Freese et al., 1982). Iseki et al., 1985: 18 (Cobija). Suárez Morales, 1986: 41 (name in list). Brown and Rumiz, 1986: 339 (Pando). Cameron et al, 1989: 64 (recorded for two sites in Pando). Tarifa, 1991: 74 (name in list). Anderson, 1993: 28 (Cobija). Rylands et al., 1993: 27 (cited previous authors).

Callithrix pygmaea: Groves, 1989: 111. Groves *in* Wilson and Reeder, 1993: 252.

Specimens, 1. **Pando:** 1102/6844, Cobija, 1 (Iseki et al., 1985).

Genus *Saguinus* Hoffmannsegg, 1807

The use of no less than seven different generic names for species now included in *Saguinus* (as reflected in the Bolivian synonymies below) indicates a history of diverse taxonomic judgments.

Saguinus fuscicollis (Spix), 1823

Mono Silbador, Chichilo

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Midas fuscicollis* was described by Spix (1823: 27), type locality for-

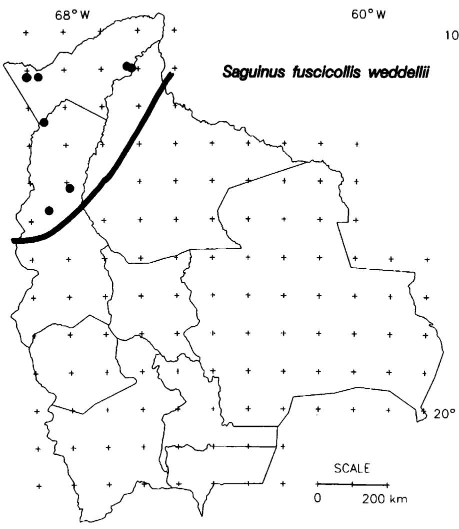


Fig. 624. Localities of known occurrence of *Saguinus fuscicollis weddellii.*

ests between the Solimoes and the Ica rivers, near São Paulo, Brazil.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 10 and 11 are of specimens from Tumupasa (US 238258, 238261).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 624. Burmeister (1869: 448) used the name *Hapale Weddellii* for two specimens from Santa Cruz de la Sierra, but the present species is not otherwise known to occur anywhere near that city. I have not seen the specimens so cannot assign them to species.

HABITAT: In all major vegetation types in Pando (Izawa and Bejarano, 1981: 7).

HABITS AND BEHAVIOR: The most common callitrichid in Pando (Izawa and Bejarano, 1981: 7). Troops were observed near Cobija (17 troops), Ixiamas (1), and Riberalta (1) by Heltne et al. (1976: table 3). In table 4, these authors estimated the densities of troops and individuals per square kilometer near Cobija to be 4.6 and 27.6, respectively. Group and individual densities near Ixiamas were 0.6 and 3.6, respectively. In 1986 near Cobija, Kohlhaas (1988) estimated density of groups to average 6.09 per km^2 or 22.65 individuals per km^2, with the mean group size 3.72 (range 1–6). Cameron et al. (1989: 64) estimated density of groups to average 4.2 per km^2 and individuals to average 25.2 per km^2. *Saguinus fuscicollis* was observed (by Heltne et al., 1976) at times in groups with each of the five other callitrichids in Pando and with *Callicebus* (Heltne et al., 1976). In northwestern Pando, *S. fuscicollis* was observed 22 times in 52.5 hours by observers walking over 212 km of trails. This is 4.18 per 10 hours or 1.04 per 10 km (Yoneda, 1983b: 48). Less commonly, *S. fuscicollis* was found with *Saimiri* or *Pithecia*. The unit group "was a family group composed of two to seven individuals" (Yoneda, 1984d: 414). *Saguinus fuscicollis* "mainly utilized the lower layer of the forest and foraged large-sized insects lurking in tree hollows" (Yoneda, 1984d: 414). Other behavioral and ecological data were published by Yoneda (1984a, 1984b). The following observations and conclusions were reported by Yoneda (1980a, 1980b). The beginning of diurnal activity was influenced more by weather and temperature than the exact time of sunrise. Upon rising, they moved quickly to find a tree in which to feed. They howled a lot, especially in the company of *Saguinus labiatus* or *Callimico goeldii*. They rarely vocalized when resting or hunting for insects. They repeated a pattern of eating, moving, hunting for insects, and resting. They usually ate once per hour for 3 to 10 minutes. They climbed a tree in a group and when done with feeding, they came down. Then they hunted for insects in hollows and cracks of trees and between roots. They ate vine seeds as well as insects; 41 types of plants were eaten and juices of two types of trees were inbibed. In 44 of 75 observations of *Saguinus fuscicollis* by Cameron et al. (1989: 66) these animals were associated with from one to three other species, among these were *S. labiatus*, *Callicebus cupreus*, *Callimico goeldii*, and *Pithecia irrorata.*

FOOD: Insects and plants, as noted above.

REPRODUCTION: In Pando, births were recorded from September to December with a peak in late September and early October. Ten of 13 groups studied had young (Yoneda, 1980a).

Scientific synonyms used for Bolivian specimens are:

Saguinus fuscicollis weddellii (Deville), 1849

Midas Weddellii Deville, 1849: 55 (type locality "province d'Apolobamba," now Provincia Franz Tamayo, Departamento La Paz, Bolivia); 1855: 23, plate 6, *in* Gervais (more descriptive details). I. Geoffroy Saint-Hilaire, 1851: 65.

Hapale weddellii: Schlegel, 1876: 262 (Apolobamba).

Leontocebus weddeli: Elliot, 1913, vol. 1: 202 (Apolobamba).

Midas weddelli: Rode, 1938: 241 (catalogue of types, Apolobamba).

Mystax imberbis Lönnberg, 1940a: 11 (type locality "Victoria near the confluence of the rivers Río Madre de Dios and Río Beni in Bolivia, and at an altitude of 175 m.").

Tamarinus weddelli: Hill, 1957: 225.

Leontocebus weddelli: Cabrera, 1958: 197.

Saguinus fuscicollis wedelli: Hershkovitz, 1968: 559 (mapped west of río Mamoré in Bolivia); 1977, p. 97 (mapped west of río Mamoré in Bolivia; on p. 400 mapped only west of río Beni). Buchanan-Smith, 1990: 205 (1111/6842).

Saguinus fuscicollis weddelli: Izawa and Bejarano, 1981: 7 (distribution in Pando). Brown and Rumiz, 1986: 341 (summary of records). Rylands et al., 1993: 55 (said to occur in Bolivia from Peru east to the Mamoré, however I know of no specimen or published record from east of the río Beni).

Saguinus fuscicollis: Heltne et al., 1976: table 2 (seen near Riberalta in the Beni, at Ixiamas in La Paz, and at Cobija in Pando). Yoneda, 1981 (Pando). Freese et al., 1982: 68 (observations at Cobija, Ixiamas, and Riberalta). Yoneda, 1982: 460. Pook and Pook, 1982: 196. Wolfheim, 1983: 173 (cited four earlier papers by Hershkovitz). Yoneda, 1984a: 1 (ecological study near Mucden); 1984d: 414 (behavioral and ecological studies at Mucden). Hanihara and Natori, 1987: 517 (studied AMNH specimens but did not list them). Natori, 1988: 263 (studied AMNH specimens but did not list them). Natori and Hanihara, 1988: 255 (studied AMNH specimens but did not list them). Kohlhaas, 1988: 95 (seen in northwestern Pando). Cameron et al, 1989: 64 (observations in Pando). Emmons and Feer, 1990: 100 (mentioned Bolivia). Emmons, 1991: 72 (seen at Alto río Madidi and 13 km W of Ixiamas in La Paz department).

Saguinus fuscicollis wedellii: Anderson, 1985b: 9 (name in list). Tarifa, 1991: 74 (name in list, summary of status). Anderson, 1993: 28 (general distributional records).

Saguinus fuscicollis weddlli: Iseki et al., 1985: 18 (Nazareth).

Sanguinus fuscicollis: Suárez Morales, 1986: 87 (Estación Biológica Beni).

LOCALITIES (9) AND SPECIMENS (22): **La Paz:** 1409/6755, Tumupasa, 3 US; 1443/6830, Apolobamba, 1 Paris (Deville, 1849). **Pando:** 1056/6618, Remanso, 2 CBF; 1059/6610, Victoria, 2 Stockholm (Lönnberg, 1940a); 1111/6842, (Buchanan-Smith, 1990); 1111/6900, Nazareth, 3 (Iseki et al., 1985); 1111/6902, Mucden, 1 La Paz, 1 FM; 1223/6835, Chivé, 1 MNLP; coordinates uncertain, "northern Bolivia," 7 (Yoneda, 1982). **Department unknown:** perhaps Bolivia, 1 MNLP.

Saguinus imperator (Goeldi), 1907

Emperor Marmoset

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Midas imperator* was described by Goeldi (1907: 93), type locality "Rio Acre and . . . upper Rio Purus," restricted to rio Acre [presumably in Brazil] by Cabrera (1958: 193). *Mystax imperator subgrisescens* was described by Lönnberg (1940a: 9), type locality Sant Antonio, Rio Eiru, Amazonas state, Brazil. See the synonymy below.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in table 10 are from Hershkovitz (1977, App. 2). Measurements in table 11 are of a specimen from Peru (AM 76013).

DISTRIBUTIONAL NOTES: Rylands et al. (1993: 65) cited Izawa and Bejarano (1981) as having "indicated that the Cobija locality reported by Heltne et al. (1976) may have resulted from confusion with *S. mystax*." This is not exactly true, for Izawa and Bejarano did not cite Heltne. Rylands et al. 1993 (on p. 22) map "S. mystax ssp." in Pando and (p. 61) discussed the earlier report by Izawa and Bejarano of "two isolated populations of *S. mystax* from the south of the Rio Acre, north of the Rio Tahuamanu, in Bolivia. One between Cobija and Buenos Aires, right bank of the Rio Acre, and another from 10 km northeast of Porvenir, 11°12′S, on the Brazil/Bolivia frontier beyond the

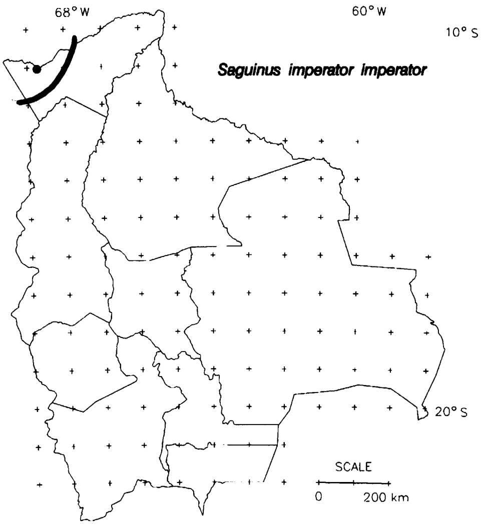


Fig. 625. Localities of known occurrence of *Saguinus imperator imperator.*

headwaters of the Rio Abuna." In the absence of any specimen from Bolivia of *S. mystax*, I do not include the species as a verified member of the Bolivian fauna. If the specimen in the Museu Goeldi is not *S. imperator* but is *S. mystax*, then the latter could be added and the former (having no other specimen to document its presence) could be removed from the list of Bolivian species until something more definite can be obtained. This illustrates how tenuous our knowledge is in this area. The distribution of *S. imperator* in the region of western Pando and adjacent countries was mapped by Izawa (1980d: 28). The only locality alleged to be represented by a specimen is noted above and mapped in figure 625.

HABITAT: High forest (Izawa and Bejarano, 1981: 9). Said to be hilly areas with dense bamboo thickets and large trees covered with vines (Izawa, 1980d).

No Bolivian data are available on habits, behavior, or reproduction.

FOOD: Said to eat fruits and insects (Izawa, 1980d).

Scientific synonyms used for the Bolivian specimen or observations are:

Saguinus imperator imperator (Goeldi), 1907

Tamarin imperator imperator: Cruz Lima, 1945: 222 (Cobija).

Tamarinus imperator: Hill, 1957: 237 (Cobija).

Saguinus imperator imperator: Hershkovitz, 1979b: 286 (Cobija). Anderson, 1985b: 9 (name in list). Tarifa, 1991: 74 (name in list, summary of status). Anderson, 1993: 28 (general distributional records).

Saguinus imperator: Heltne et al., 1976: table 2 ("reliable reports" near Cobija). Hershkovitz, 1977: 684 (Cobija). Bejarano, 1980: 698 (general map). Freese et al. (1982: 73, local reports, regarded by the authors as reliable, from near the Peruvian border between ríos Acre and Nareuda in Pando, as well as north of Acre in Brazil). Emmons and Feer, 1990: 104 (mentioned Bolivia).

Sanguinus imperator: Suárez Morales, 1986: 41 (name in list).

Saguinus imperator subgrisescens: Izawa and Bejarano, 1981: 8 (in basin of the río Muyumanu, a right hand tributary of the Tahuamanu, in Pando). Brown and Rumiz, 1985: 341. Rylands et al., 1993: 64 (between the ríos Tahuamanu and Muyumanu; questioned the reports from Cobija; no evidence given to support the subspecific assignment).

Specimen, 1. **Pando:** 1102/6844, Cobija, 1 Museu Paraense Emilio Goeldi (Cruz Lima, 1945).

Saguinus labiatus labiatus (É. Geoffroy Saint-Hilaire *in* Humboldt), 1812

White-lipped Marmoset, Red-chested Moustached Tamarin

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Midas labiatus* was described by É. Geoffroy Saint-Hilaire (*in* Humboldt, 1812: 361), type locality "Probablement le Bresil," restricted to "los alrededores del lago Joanacan [= Janauaca], estado de Amazonas, Brasil," by Cabrera (1958: 194); but according to Hershkovitz (1977: 692), "the type of *labiatus* probably originated somewhere between the Rios Purus and Madeira south of the Rio Ipixuna."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in table 10 are of a specimen from Brazil (AM 20361).

KARYOLOGY: Based on study of two males and one female from Cobija, Pando, the diploid chromosome number is 46 (Minesawa and Valdivia Borda, 1984b: 55).

DISTRIBUTIONAL NOTES: In Pando south to

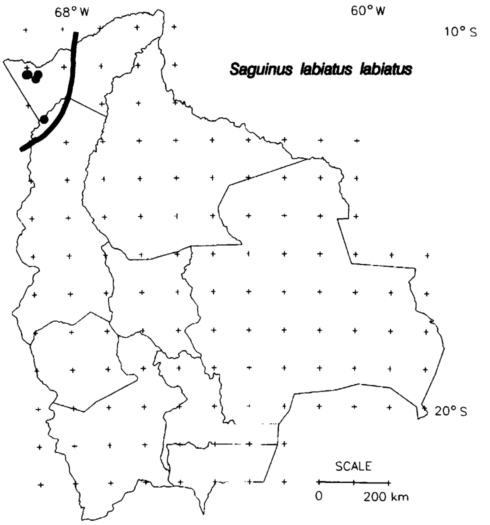


Fig. 626. Localities of known occurrence of *Saguinus labiatus labiatus*.

the río Tahuamanu (Izawa and Bejarano, 1981: 8). Bolivian distribution mapped in figure 626.

HABITAT: Low forest (Izawa and Bejarano, 1981: 9).

HABITS AND BEHAVIOR: Troops (15) were observed near Cobija by Heltne et al. (1976: table 3). In table 4, these authors estimated the densities of troops and individuals per square kilometer to be 4.6 and 27.6, respectively. In northwestern Pando, *S. labiatus* was observed 17 times in 52.5 hours by observers walking over 212 km of trails. This is 3.23 per 10 hours or 0.80 per 10 km (Yoneda, 1983b: 48). In 1986 near Cobija, Kohlhaas (1988) estimated the density of groups to average 4.46 per km^2 or 12.00 individuals per km^2, with the mean group size 2.69 (range 1–8). Cameron et al. (1989: 64) estimated density of groups to average 2.8 per km^2 and individuals to average 16.8 per km^2. "*S. labiatus* mainly utilized the middle layer of the forest and foraged small-sized animals on branches" (Yoneda, 1984d: 414). Groups were seen in association with *Saguinus fuscicollis* and *Callimico goeldii* in northwestern Pando. In 44 of 61 observations of *Saguinus labiatus* by Cameron et al. (1989: 66), these animals were associated with from one to three other species, among these were *S. fuscicollis*, *Callicebus cupreus*, *Callimico goeldii*, and *Pithecia irrorata*. Other behavioral and ecological data were published by Yoneda (1984a).

FOOD: See note above.

REPRODUCTION: Births occurred from October to December in Pando, with a peak in late October. Six of 10 groups studied had babies (Yoneda, 1980a).

Scientific synonyms used for Bolivian specimens are:

Saguinus labiatus labiatus: Hershkovitz, 1968: 563 (first use of name combination). Izawa and Bejarano, 1981: 7 (observations in Pando). Iseki et al., 1985: 18 (Nazareth and Isla Gargantua). Anderson, 1985b: 9 (name in list). Brown and Rumiz, 1986: 342 (Pando). Masataka, 1988: 55 (Cobija, Mucden, and Nareuda; behavior). Buchanan-Smith, 1990: 205 (1111/6842). Tarifa, 1991: 74 (name in list, summary of status). Rylands et al., 1993: 62 (summarize earlier report by Izawa and Bejarano).

Saguinus labiatus var. *rufiventris*: Bejarano, 1980: 698 (general map).

Saguinus labiatus: Heltne et al., 1976: 9 (observed near Cobija, population status). Yoneda, 1981 (Pando). Freese et al., 1982: 68 (ambiguous reports from Riberalta in the Beni, seen near Cobija in Pando). Yoneda, 1982: 460. Pook and Pook, 1982: 196. Yoneda, 1984d: 414 (behavioral and ecological studies at Mucden in Pando). Minesawa and Valdivia Borda, 1984b: 60 (near Cobija). Hanihara and Natori, 1987: 517 (studied AMNH specimens but did not list them). Natori, 1988: 263 (studied AMNH specimens but did not list them). Natori and Hanihara, 1988: 255 (studied AMNH specimens but did not list them). Kohlhaas, 1988: 95 (observations in northwestern Pando). Cameron et al, 1989: 64 (observations in Pando). Emmons and Feer, 1990: 103 (mentioned Bolivia). Anderson, 1993: 28 (general distributional records).

Saguineus labiatus: Tello, 1986: 17 (observed at Laguna Bay in the Reserva Nacional de Fauna Manuripi Heath).

LOCALITIES (8) AND SPECIMENS (16): **Pando:** 1110/6858, Cobija (Masataka, 1988); 1111/6842, (Buchanan-Smith, 1990); 1111/6900, Nazareth, 2 (Iseki et al., 1985); 1111/6902, Mucden, 1 La Paz, (Masataka, 1988); 1118/6846, Nareuda (Masataka, 1988); 1118/6846, río Nareuda area, 1 AM; 1223/6835, Isla Gargantua, 1 (Iseki et al., 1985); coordinates uncertain, probably Pando, 3 MNLP; coordinates uncertain, "northern Bolivia," 5 (Yoneda, 1982a).

Saguinus, of undetermined species

Department unknown: "Bolivia" only, 2 BM (Napier, 1976: 30).

FAMILY CEBIDAE BONAPARTE, 1831

In addition to the following taxa, *Lagothrix lagothricha* has been reported and mapped as occurring in northern Bolivia (Emmons and Feer, 1990: 129). Izawa and Bejarano (1981: 4) reported that "some 10–20 years ago hunters captured this species of monkey several times to the east of a line linking Cobija and Porvenir, i.e. in the head of the Rio Abuna in Bolivian territory, a small population of *L. lagothricha* must have crossed the head basin of the Rio Abuna to its right bank. It is, however, sure that the monkey does not still exist in the locality in Bolivian territory." Bejarano (1980: 697) had reported seeing an individual of this species in captivity in the Pando, but since monkeys are commonly transported by people, and sometimes for considerable distances, this was not regarded by him as unambiguous evidence of the presence of the species in Pando. Fooden (1963: 216), on geographic grounds, also mapped its possible occurrence in Pando. In the absence of a well-documented specimen or photograph, this species is not considered here to be a part of the Bolivian fauna.

PARASITOLOGY: The sucking louse, *Pediculus mjobergi*, was reported from some Bolivian cebid, presumably *Ateles*, *Alouatta*, or *Cebus* (Durden and Musser, 1994: 51). The flea *Ctenocephalides felis felis* was reported from "mono uroro" from El Vale in Santa Cruz (Hopkins and Rothschild, 1953: 154). I do not know what monkey may have been known by that common name. I know of no specimen of a monkey from El Vale. The fleas were collected by F. L. Soper in 1938.

SUBFAMILY ALOUATTINAE TROUESSART, 1897

Genus *Alouatta* Lacépède, 1799

Howler Monkey, Mono Maneche, Mono Aullador

This subfamily was recognized by Groves (*in* Wilson and Reeder, 1993:254) for this genus alone. Misspelled as *Allouata* by Rubio et al. (1991: 14).

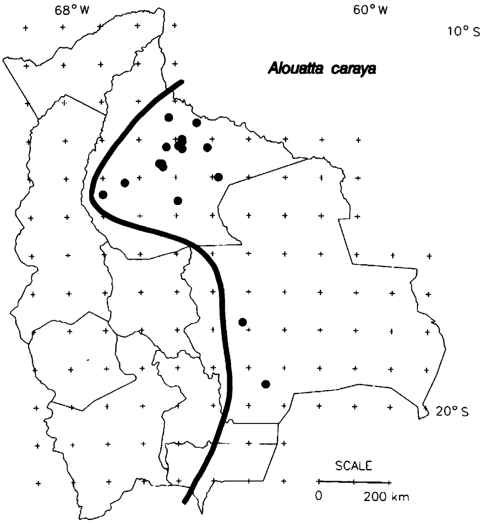


Fig. 627. Localities of known occurrence of *Alouatta caraya*.

All Bolivian *Alouatta* are regarded as threatened (CITES, Appendix II).

Alouatta caraya (Humboldt), 1812

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Simia Caraya* was described by Humboldt ("1811" [1812]: 355), type locality Paraguay. Lesson (1840: 122) first used the name combination *Alouatta caraya*. *Stentor niger* was described by É. Geoffroy Saint-Hilaire (1812: 108); type locality "Paraguay."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 10 and 11 are of specimens from 8 km N of Exaltación (AM 211495, 211497–211498, 211501–211502) and Puerto Caballo (AM 211505–211514).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 627.

HABITAT: Forested lowland areas.

HABITS AND BEHAVIOR: Two troops were observed near San José by Heltne et al. (1976: table 3). In table 4, these authors estimated the densities of troops and individuals per square kilometer to be 0.4 and 0.8, respectively.

No Bolivian data are available on food.

REPRODUCTION: Two pregnant females

(each with one embryo) were recorded in August and September.

Scientific synonyms used for Bolivian specimens are:

Alouatta caraya: Elliot, 1913, vol. 1: 266 ("Bolivia"). Lönnberg, 1941: 35 (Mojos, Orion). Krieg, 1930: 772 (seen at Chiquitos). Cabrera, 1939: 18 (northeastern Bolivia). Cabrera, 1958: 153 (eastern Bolivia). Hill, 1962: 136, map 1 (Mojos, cited from Lönnberg). Napier, 1976: 79 ("Bolivia"). Heltne et al., 1976: 11 (seen near San José de Chiquitos). Freese et al., 1982: 68 (seen near San José de Chiquitos). Anderson, 1985b: 9 (name in list). Brown and Rumiz, 1986: 351 (summary). Suárez Morales, 1986: 86 (name in list, Estación Biológica Beni). Braza and García, 1988: 182 (vocalizations heard in Huanchaca area of northern Santa Cruz). Emmons and Feer, 1990: 126 (mentioned Bolivia). Tarifa, 1991: 73 (name in list). Ergueta and Salazar B., 1991: 15 (general summary). Anderson, 1993: 27 (general distributional records). Anderson et al., 1993: 31 (vicinity of Santa Cruz de la Sierra). Parker et al., 1993: 54 (heard near San Fernando, 1715/5841, identification uncertain).

Mycetes niger: I. Geoffroy Saint-Hilaire, 1851: 53 (Santa Cruz de la Sierra). Gerrard, 1862: 23 (3 specimens, Bridges coll., Bolivia only). Schlegel, 1876: 149 (Santa Cruz de la Sierra).

Alonatta caraya: Arce et al., 1963: 152 (no specimen, name in list, río Chapare).

LOCALITIES (17) AND SPECIMENS (75): **Beni:** 1226/6511, río Mamoré, 1 AM; 1234/6425, mouth of río Machupo, 1 AM; 1300/6449, Aguadulce, 10 km N of San Joaquín, 3 FM; 1304/6449, near San Joaquín, 2 AM; 1310/6455, 15 km SW of San Joaquín, 2 AM; 1312/6515, 8 km N of Exaltación, 8 AM; 1313/6408, 12 km N Magdalena, 7 US; 1315/6449, Yutiole, 9 AM; 1338/6523, mouth of río Yacuma, 5 AM; 1338/6527, 6 km from río Yacuma mouth, 2 AM; 1343/6521, Puerto Caballo, 10 AM; 1400/6350, Los Totumu, 2 MNK; 1408/6624, Espíritu, 1 MNLP; 1426/6700, Mojos, Orion, 1 Stockholm (Lönnberg, 1941); 1437/6457, mouth of río Ibare, 1 AM. **Santa Cruz:** 1748/6310, Santa Cruz de la Sierra, 1 AM, 3 Paris (I. Geoffroy Saint-Hilaire, 1851); 1926/6231, río Parapeti, Guaripembi, 4 EBD. **Department unknown:** "Bolivia" only, 8 BM (Napier, 1976), 4 MNLP.

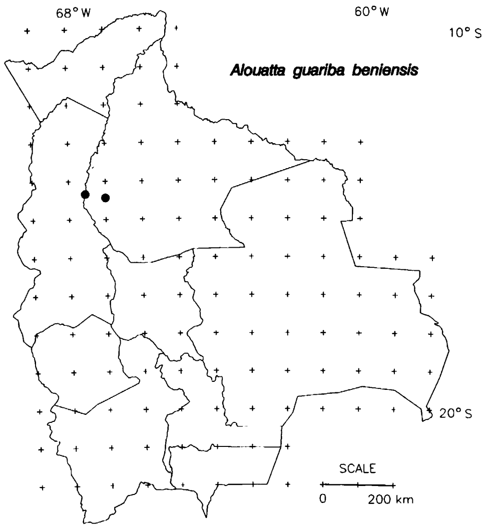


Fig. 628. Localities of known occurrence of *Alouatta guariba beniensis*. Identification is uncertain.

Alouatta guariba (Humboldt), 1812

Brown Howler

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Alouatta guariba* was described by Humboldt (1812: 355); type locality Brazil, restricted by Cabrera (1958: 155) to Rio Paraguassu, Baia. *Stentor fusca* was described by É. Geoffroy Saint-Hilaire (1812: 108); type locality "Bresil." The six Bolivian specimens that have been referred to *Alouatta fusca* or *A. guariba* must be restudied to verify or correct the identification. *Alouatta guariba* is not otherwise known anywhere near Bolivia. On my behalf, Leandro Salles (in 1989) looked for these specimens in Stockholm but they were not found at the time. I suspect that these may eventually prove to be of *Alouatta seniculus*.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 628.

Scientific synonyms used for the six Bolivian specimens are:

Alouatta guariba beniensis Lönnberg, 1941

Alouatta beniensis Lönnberg, 1941: 24 (type locality "Puerto Salinas, Río Beni, Bolivia. Altitude 196–226 m," in the department of Beni).

Alouatta guariba beniensis: Cabrera, 1958: 154. Hill, 1962, map 1. Anderson, 1993: 27 (Puerto Salinas).

Alouatta fusca beniensis: Anderson, 1985b: 9 (name in list). Brown and Rumiz, 1986: 350.

Alouatta fusca: Emmons and Feer, 1990: 127 ("possibly a disjunct population in Beni, Bolivia" Bolivia). Corbet and Hill, 1991: 96 (name in list). Tarifa, 1991: 73 (name in list, summary of status). Groves *in* Wilson and Reeder, 1993: 255 (noted that *beniensis* may actually be *A. seniculus*).

LOCALITIES (2) AND SPECIMENS (6): **Beni:** 1420/6733, Puerto Salinas, 5 Stockholm (Lönnberg, 1941); 1426/6700, Orion, Mojos, 1 Stockholm (Lönnberg, 1941).

Alouatta seniculus (Linnaeus), 1766

Red Howler

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Alouatta seniculus* was described by Linnaeus (1766: 37), type locality Cartagena, Bolivar department, near the río Magdalena, Colombia. *Simia ursina* of Humboldt (1812: 108) was preoccupied. Groves (*in* Wilson and Reeder, 1993: 255) recognized as distinct species both *Alouatta sara* and *A. seniculus* and wrote that Minezawa et al., "1985" = 1986, had separated them. Although Minezawa et al., 1986: 12, noted (conditionally) that central Bolivian red howler monkeys should be split from *A. seniculus* as an independent species (*if* we accept the splitting of *Aotus* and *Saimiri* from one species to many species mainly on the basis of karyotypic differentiation), they did not take the formal step of recognizing two species and they did use the name *Alouatta seniculus sara* throughout the paper.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 10 and 11 are of specimens from the mouth of the río Chapare (ANSP 19428, 19429) and the río Chimoré (AM 38808, 38809). Measurements of two skulls were published by Pilleri (1977b: 40).

KARYOLOGY: The diploid chromosome number based on study of 20 females and 11 males from near Colonia Piray varies from 48 to 51 (Minezawa et al., "1985" = 1986; Lima et al., 1990). A different number was often seen in different cells of one individual. The numbers of bi-armed chromosomes (including the X chromosome) differ between male and female, the latter have nine pairs and males have seven pairs and two unpaired bi-armed chromosomes.

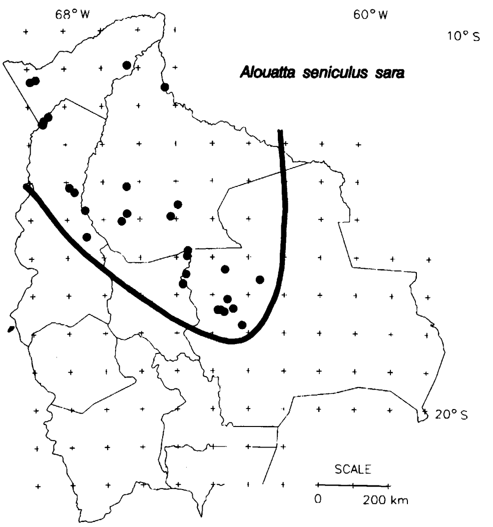


Fig. 629. Localities of known occurrence of *Alouatta seniculus sara*.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 629.

HABITAT: In Pando, Izawa and Bejarano (1981: 5) noted that *A. seniculus* "chooses to live along the rivers" in high or low forest or secondary growth.

HABITS AND BEHAVIOR: Even under high hunting pressure, they were said to maintain themselves in Pando by hiding in the tops of high trees (Izawa and Bejarano, 1981: 5). Groups of 2 to 11 were observed. One troop was observed near Ixiamas and 26 near El Triunfo by Heltne et al. (1976: table 3). In table 4, these authors estimated the densities of troops and individuals per square kilometer at El Triunfo to be 15.0 and 120.0, respectively; at Ixiamas these densities were 1.0 and 8.0. The mean group size and standard deviation for 42 observations of groups at the Estación Biológica Beni by García and Tarifa (1989: 98) was 4.4 ± 1.8. Cameron et al. (1989: 64) estimated density of groups to average 0.4 per km^2 and individuals to average 1.2 per km^2.

FOOD: Mainly leaves.

REPRODUCTION: No Bolivian data.

Scientific synonyms used for Bolivian specimens are:

Alouatta seniculus sara Elliot, 1910

Stentor stramineus: d'Orbigny and Gervais, 1847: 9 (Santa Cruz, Chiquitos, and Moxos provinces), not the *Stentor stramineus* of É. Geoffroy Saint-Hilaire according to Hershkovitz, 1987b: 74.

Mycetes seniculus: I. Geoffroy Saint-Hilaire, 1851: 52 (Santa Cruz de la Sierra). Burmeister, 1869: 447 (Santa Cruz de la Sierra). Schlegel, 1876: 158 (Santa Cruz de la Sierra). Pelzeln, 1883: 4 (Cachoeira da Bananeira).

Mycetes ursinus: Burmeister, 1869: 447 (Santa Cruz de la Sierra, female and young MACN, probably this locality and species).

Alouatta sara Elliot, 1910: 81 (type locality "Province of Sara, Bolivia," in Santa Cruz department). Elliot, 1913, vol. 1: 283. Groves *in* Wilson and Reeder, 1993: 255.

Alouatta seniculus sara: Cabrera, 1958: 156. Hill, 1962, map 1. Pilleri, 1977b: 40 (río Ichilo, Estancia La Habana). McLaren et al., 1984: 484 (río Surutú, río Yapacaní, province of Sara, unknown locality). Anderson, 1985b: 9 (name in list). Minezawa et al.,"1985" = 1986: 8 (chromosomes, Colonia Piray). Brown and Rumiz, 1986: 350 (summary). Suárez Morales, 1986: 40 (name in list). Tarifa, 1991: 73 (name in list). Anderson, 1993: 27 (general distributional records). Anderson et al., 1993: 32 (vicinity of Santa Cruz de la Sierra).

Alouatta seniculus: Napier, 1976: 83 (Sara, Buenavista, "Bolivia" only). Heltne et al., 1976: table 2 (observations at El Triunfo, Cobija, and Ixiamas). Bejarano, 1980: 689 (general map). Izawa and Bejarano, 1981: 5 (observations in Pando). Freese et al., 1982: 68 (reported near Riberalta in Beni, seen near Cobija in Pando, Ixiamas in La Paz, and El Triunfo in Beni). Iseki et al., 1985 (Neuva España in Pando). Cabot et al., 1986: 42 (name in list). García and Braza, 1987: 338 (observed in the Beni Biological Reserve). García and Tarifa, 1989: 98 (observations at EBB). Kohlhaas, 1988: 95 (seen in northwestern Pando). Eisenberg, 1989: 253 (mentioned Bolivia). Cameron et al, 1989: 64 (observations in Pando). Stearman, 1990: 380 (Yuquí camp at 1647/6457). Emmons and Feer, 1990: 125 (mentioned Bolivia). Hinojosa *in* Estenssoro, 1990 (collected in Chimane region). Lima et al., 1990: 790 (chromosomes and proteins, comparison with Minezawa et al., 1986). García and Tarifa, 1991: 6 (Estación Biológica Beni). Emmons, 1991: 72 (seen at Alto río Madidi in La Paz department). Hinojosa P., 1991, 1992b (Serranía Eva Eva). Groves *in* Wilson and Reeder, 1993: 255 (see note above). Vargas and Méndez *in* Altamirano C. and Seidel, 1992 (reported from Isiboro-Sécure area).

Alonatta seniculus: Tello, 1986: 16 (discussion of current status of this and other howler monkeys in Bolivia).

LOCALITIES (35) AND SPECIMENS (128): **Beni:** 1131/6517, 5 km SE of Coimbra [Brasil], 5 AM; 1408/6621, Espíritu, 1 IE; 1410/6449, Estancia La Habana (no. 662, Pilleri, 1977b: 40); 1437/6457, mouth of río Ibare, 4 AM; 1451/6621, Mato Totaisal, 1 EBD; 1451/6621, Reserva Biologica del Beni, La Cabaña, 2 EBD; 1456/6509, río Tijamuchi, 1 AM; 1503/6630, Aserradero Triunfo, 28 km E and 20 km S of San Borja, 1 EBD; 1536/6638, Sierra Eva Eva, Campamento Arroyo Chontal, 1 IE; 1550/6441, río Mamoré, 5 km NW of mouth of río Grande, 2 AM. **Cochabamba:** 1558/6442, mouth of río Chapare, 2 ANSP; 1627/6444, río Ichilo, 27 km NE mouth of río Chimoré, 2 AM; 1642/6449, río Ichilo, 2 km N of mouth of río Chimoré, 2 AM; 1643/6449, río Chimoré, 2 AM; 1647/6457, río Chimoré, 4 CBF; 1647/6457, Campamento Yuqui, 1 MNLP; 1648/6447, Vita Lei on río Ichilo (no. 661, Pilleri, 1977b: 40). **La Paz:** 1409/6755, Tumupasa, 12 AM; 1416/6747, 18 km SE of Tumupasa, 2 AM; 1445/6730, río Quiquibey, 2 MNLP; 1527/6728, Puerto Linares, 1 MNLP. **Pando:** 1056/6618, Remanso, 3 CBF; 1118/6846, río Nareuda area, 11 AM; 1121/6855, Santa Rosa, 1 La Paz; 1216/6827, 8 km SO de [= SW of] Santa Rosa, 1 CBF; 1223/6835, Chivé, 1 MNLP; 1228/6836, Nueva España, 1 (Iseki et al., 1985). **Santa Cruz:** 1620/6339, Colonia Piray, 33 captured (Minezawa et al., "1985" = 1986); 1636/6241, La Laguna, [9 km N of] San Ramón, 3 EBD; 1642/6449, río Ichilo, 2 km N mouth of río Chimoré, 3 AM; 1707/6335, "Del Sara," 1 CM; 1722/6325, province of Sara, 4 BM (Napier, 1976); 1724/6346, río Yapacaní, 1 CM, 2 FM; 1724/6351, río Surutú, 2 CM; 1727/6340, Buenavista, 1 BM (Napier, 1976), 1 FM; coordinates uncertain, La Perdix in province of Sara, 1 ANSP; 1748/6310, Santa Cruz de la Sierra, 1 Paris (I. Geoffroy Saint-Hilaire, 1851), 1 MACN (not examined; 3

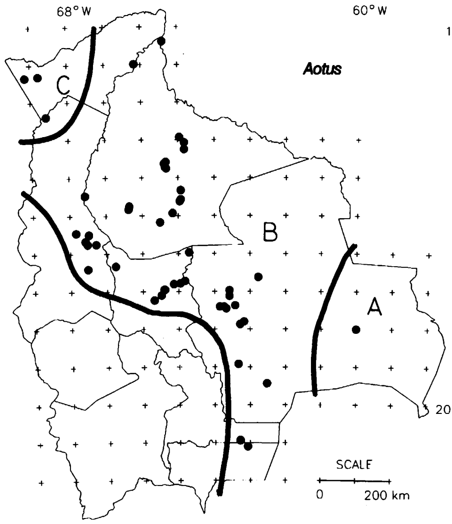


Fig. 630. Localities of known occurrence of three taxa of *Aotus*, *A. azarai azarai* (A), *A. azarai boliviensis* (B), and *A. nigriceps* (C).

reported by Burmeister, 1869). **Department uncertain:** coordinates uncertain, río Napo, 1 US; "Bolivia" only, 2 BM; Bolivia, perhaps, 1 CM.

Alouatta, undetermined species

Tello (1986: 16) reported observations of *Alouatta*, misspelled as *Allonata*, but not identified to species.

LOCALITIES (16) AND SPECIMENS (28): **Beni:** 1315/6420, Piedras Blancas, 1 MNK; 1400/6350, Los Totumu, 2 MNK; 1414/6615, Campamento Chimán 08, 1 CBF; 1546/6524, 2 km río arriba de Puerto San Lorenzo, 1 CBF; coordinates uncertain, río Sécure, Arroyo Salinas, 1 CBF; coordinates uncertain, Patuhusal, TIPNIS, 1 CBF. **La Paz:** 1545/6717, río Colorado, 3 US. **Pando:** 1122/6658, Nueva Etea, 1 MSB; 1150/6845, Manuripi Heath National Wildlife Reserve, 2 MNK; 1200/6816, río Madre de Dios, 5 km upstream from Cachuelas Monte Verde, 1 MSB; 1223/6835, Chivé, 1 MSB. **Santa Cruz:** 1727/6340, Buena Vista, 4 MACN (not examined); 1805/6250, Brecha 5.5, ca. 55 km SE of Santa Cruz, 1 MSB; 1818/5936, 4 km N and 1 km W of Santiago de Chiquitos, 2 AM. **Department uncertain:** coordinates uncertain, río Beni, 2 MACN (not examined).

SUBFAMILY AOTINAE POCHE, 1908

Genus *Aotus* Illiger, 1811

Owl Monkey, Mono Nocturno, Mono Anteojero or Cuatro Ojos, Mirikina

This subfamily was recognized by Groves (*in* Wilson and Reeder, 1993: 255) and includes only this genus. The taxonomy of the genus has undergone considerable change as indicated by the synonymies below.

Aotus azarai (Humboldt), 1812

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Simia* (*Pithecia*) *Azarae* was described by Humboldt ("1811" = 1812: 359); type locality "Paraguay" (in an older and broader sense), by implication restricted by Elliot (1913, vol. 2: 11) to the "right bank of the river Paraguay north-eastern part of the Argentine Republic." *Callithrix infulatus* was attributed to Lichtenstein by Kuhl (1820: 38), type locality Pará, Brazil. *Nyctipithecus felinus* was described by Spix (1823: 24), type locality Belem do "Para," Brazil. *Aotus roberti* was described by Dollman (1909: 199), type locality "Serra de Chapada, Matto Grosso, Brasil." The name *Aotus bidentatus* was proposed provisionally by Lönnberg (1941: 44): "if the presence in the upper jaw of only the two median incisors is a general feature in the specimens from Chulumani, it proves certainly a different species, which deserves the name *bidentatus*."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Among Bolivian primates, *Aotus* is distinguished by relatively large eyes which are emphasized by whitish patches above.

KARYOTYPE: The diploid chromosome number is 50 in females and 49 in males (Cambefort and Moro, 1978: 308, studied two of each sex). Specimens from the vicinity of Santa Cruz de la Sierra were studied by Minezawa and Valdivia Borda (1984b: 55); 16 males and 27 females confirmed the numbers reported by Cambefort and Moro (1978).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 630.

HABITAT: Wooded areas in the lowlands and in the Yungas up to at least 2225 m elevation at Incachaca.

HABITS AND BEHAVIOR: Nocturnal, but also seen in the daytime. Most of activity, both feeding and traveling, is in the first half of the night and "the average distance travelled per night was 337.4 m" (based on observations of a group of three in Beni on 10 nights by García and Braza, 1987: 337). In Pando, seen in association with *Saguinus fuscicollis*, *S. labiatus*, and *Callicebus brunneus* (Izawa, 1980f). The mean group size and standard deviation for 23 observations of groups at the Estación Biológica Beni by García and Tarifa (1989: 98) was 3.6 ± 0.8. The number of individuals per km^2 in their study site at EBB was estimated as 237.9 based on the "nonlinear density plot method" (García and Braza, 1989: 49). Other methods gave lower estimates, but analysis of earlier home range data (not specifically cited here) gave estimates closer to the high value.

FOOD: Omnivorous, but no detailed study in Bolivia.

REPRODUCTION: Data on eight females are available; two had no embryos in September; one had one embryo in August, and five had one embryo in September.

CONSERVATION STATUS: Listed as threatened (CITES, Appendix II).

Scientific synonyms used for Bolivian specimens are given under subspecies below:

Aotus azarai azarai
(Humboldt), 1812

Aotes miriquina: Krieg, 1930: 769 (Chiquitos).

Aotus trivirgatus: Heltne et al., 1976: table 2 ("reliable reports" near San José de Chiquitos). Freese et al., 1982: 68 (San José de Chiquitos).

Aotus azarae azarae: Hershkovitz, 1983: 214 (map with numbered Bolivian localities, but no list of these localities). McLaren et al., 1984: 481. Anderson, 1985: 8 (name in list). Brown and Rumiz, 1986: 343 (summary). Tarifa, 1991: 73 (name in list, summary of status). Anderson, 1993: 27 (general distributional records).

Aotus azarai: Groves *in* Wilson and Reeder, 1993: 255 (spelling changed to conform with Code). Price and Timm, 1995: 662 (río Mamoré, AM 211460).

LOCALITIES (1) AND SPECIMENS (1): **Santa Cruz:** 1800/6000, Chiquitos, 1 (Krieg, 1930).

Aotus azarai boliviensis
Elliot, 1907

Nyctipithecus felinus: I. Geoffroy Saint-Hilaire, 1851: 39 (province of Moxos). Gerrard, 1862: 28 (one specimen from Bolivia, Bridges coll.).

Nyctipithecus azarae: Schlegel, 1876: 213 (province of Moxos).

Nyctipithecus Azarae: Pelzeln, 1883: 18 (Engenho do Cap. Gama am Rio Guapore, perhaps in Bolivia).

Aotus boliviensis Elliot, 1907: 189 (type locality "Province of Sara, Central Bolivia," in Santa Cruz department). Elliot, 1913, vol. 2: 11. Osgood, 1916: 216 (junction of ríos San Antonio and Espírito Santo). Soria, 1957b: 3 (Buenavista, MACN 50.137). Arce Pereira et al., 1963: 152 (name in list; río Chapare, Todos Santos).

Aotus bidentatus Lönnberg, 1941: 44 (provisional name, see taxonomic remarks above).

Aotus roberti: Lönnberg, 1941: 42 (Chulumani). Cambefort and Moro, 1978: 308 (karyotype; tentative use of name).

Aotus trivirgatus infulatus: Lönnberg, 1941: 40 (confluence of río Madre de Dios and río Beni). Hill, 1960: 176.

Aotus trivirgatus boliviensis: Hershkovitz, 1949a: 402 (use of name). Hill, 1960: 178. Suárez Morales, 1986: 40 (name in list).

Aotes boliviensis: Vieira, 1955: 375 ("Bolivia central").

Aotus trivirgatus: Soria, 1957b: 3 (río Surutú, MACN 17.20). Napier, 1976: 48 (Incachaca, Yungas of Cochabamba, Buenavista, Sara Province). Thorington and Vorek, 1976: 1006 (map six localities in Bolivia). Heltne et al., 1976: table 2 ("reliable reports" near Ixiamas, Riberalta, and El Triunfo). Bejarano, 1980: 691 (general map). Freese et al., 1982: 68 (observations at Ixiamas in La Paz and El Triunfo in Beni). Tello, 1986: 15 (reports and current status). Ergueta and Salazar B., 1991: 14 (general summary). Emmons, 1991: 72 (seen at Alto río Madidi in La Paz department). Parker et al., 1993: 101 (captive seen at Cerro Colorado, reported by local people at Perforación).

Aotus azarae boliviensis: Hershkovitz, 1983: 214 (map with numbered Bolivian localities, but no list of these localities). McLaren et al., 1984: 481 (río Quiser, río Surutú). Anderson, 1985b: 8 (name in list). Brown and Rumiz, 1986: 343 (summary). Suárez Morales, 1986: 86 (undocumented name in list). Tarifa, 1991: 73 (name in list, summary of status). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from

Isiboro-Sécure area). Anderson, 1993: 27 (general distributional records). Anderson et al., 1993: 30 (vicinity of Santa Cruz de la Sierra).

Aotus azarae azarae: McLaren et al., 1984: 481 (as "Rio Grande," cited here as río Mapaiso).

Aotus azarae: Minezawa and Valdivia Borda, 1984b: 58 (near Santa Cruz). Cabot et al., 1986: 42 (name in list). García and Braza, 1987: 337 (behavioral study in the Beni Biological Reserve). García and Tarifa, 1989: 98 (observations at EBB). Braza and García, 1988: 182 (vocalizations heard in Huanchaca area of northern Santa Cruz). García and Braza, 1989: 45 (population density estimates in Beni). García and Tarifa, 1991: 9 (Estación Biológica Beni).

Aotus spp.: Stearman, 1990: 380 (Yuquí camp at 1647/6457).

LOCALITIES (48) AND SPECIMENS (144): **Beni:** 1023/6524, río Beni, 1 US [coordinates uncertain]; 1256/6457, Azunta, 1 FM; 1304/6449, San Joaquín, 3 FM; 1315/6449, Yutiole, 12 AM; 1335/6520, río Mamoré, 5 AM; 1338/6523, río Yacuma at mouth, 1 AM; 1343/6521, Puerto Caballo, 3 AM; 1345/6519, río Apere, 4 km above mouth, 1 AM; 1420/6455, 10 km W San Pedro, 2 AM; 1428/6734, Rurrenabaque, 1 US; 1434/6455, 23 km W of San Javier, 6 AM; 1437/6457, río Ibare at mouth, 3 AM; 1445/6621, 6 km N of Isla de Crete, río Curiaba, 1 EBD; 1448/6418, Ibiato, 6 CBF, 4 MNK (not seen, W. Townsend, in litt.); 1450/6622, Los Tajibos, 40 km E of San Borja, 1 EBD; 1456/6509, río Tijamuchi, 1 MSB; 1510/6530, province of Moxos, 1 Paris (I. Geoffroy Saint-Hilaire, 1851). **Chuquisaca:** 2056/6321, Laguna Palmar, 500 m SE of, 2 AM. **Cochabamba:** 1558/6442, río Chapare at mouth, 1 ANSP; 1620/6645, yungas of Cochabamba, 1 BM; 1643/6449, río Chimoré, 5 CBF; 1647/6457, Campamento Yuqui, 5 MNLP; 1648/6508, Todos Santos, 3 ANSP; 1657/6523, Balneario Las Pozas, 2 EBD; 1657/6524, San Antonio, 2 AM; 1657/6524, junction of ríos San Antonio and Espírito Santo, 1 AM, 2 FM; 1706/6529, Palmar, 4 ANSP, 1 FM; 1714/6541, Incachaca, 3 BM (Napier, 1976). **La Paz:** 1527/6750, Santa Ana on río Coroico, 1 ANSP; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 1 TTU; 1540/6735, Serranía Bellavista, 35 km by road N of Caranavi, 1650 m, 1 AM; 1545/6717, río Colorado, 1 US; 1545/6731, 1 km S of La Reserva, 1 CBF; 1624/6731, Chulumani, 1 Stockholm (Lönnberg, 1941). **Pando:** 1059/6610, confluence of ríos Madre de Dios and Beni, 3 (Lönnberg, 1941). **Santa Cruz:** 1637/6246, río Quiser, 2 CM; 1658/6335, 15 km N of Santa Rosa, 1 EBD; 1707/6335, near Santa Rosa, 1 MSB; 1722/6325, province of Sara, 2 BM (holotype and one other), 1 CM; 1724/6344, 7 km N and 17 km W of Buenavista, 1 AM; 1724/6351, río Surutú, 1 CM, 6 MACN (not examined); 1727/6340, Buenavista, 2 ANSP, 2 BM, 1 FM, 1 MCZ, 12 MACN (not examined); 1748/6310, Santa Cruz (assumed to be the city), 1 MACN (not examined); 1752/317, río Mapaiso, 1 CM; 1855/6320, río Grande, province of Cordillera, 4 CM; 1926/6231, río Parapeti, Guaripembi, 1 EBD. **Tarija:** 2106/6304, 35 km S of Carandayti, 1 LACM. **Department unknown:** "Bolivia" only, 2 BM (Napier, 1976), 4 MNLP, 2 MACN (not examined); Bolivia or Brazil, on the border, Engenho do Cap. Gama am Rio Guapore, 1 (Pelzeln, 1883; identification uncertain, probably either *A. nigriceps* or *A. azarai boliviensis*).

Measurements in tables 10 and 11 are of specimens from 23 km W of San Javier (AM 211469–211473), Puerto Caballo (AM 211466), and Laguna Palmar (AM 246657, 246658). Data for Ibiato in table 5 are from W. Townsend (in litt.).

Aotus nigriceps Dollman, 1909

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Aotus nigriceps* was described by Dollman (1909: 200), type locality Chanchamayo, Peru.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: An interscapular whorl of hair may seem to be present or not; underparts are orange and this color extends onto chin, sides of neck, and on the hind leg to midtibia or ankle (Hershkovitz, 1983: 216).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 630.

HABITAT: "Prefers to live in Monte bajo and Barbecho tupido" (Izawa and Bejarano, 1981: 6). Monte bajo was defined as undamaged tropical forest with low trees, bamboo thickets, and vines and shrubs well developed and Barbecho tupido as secondary forest with bamboo thickets, vines, shrubs, and grasses and without a higher forest canopy.

HABITS AND BEHAVIOR: Nocturnal.

FOOD: Omnivorous, but no specific Bolivian data available.

REPRODUCTION: No data.

CONSERVATION STATUS: Regarded as threatened (CITES, Appendix II).

Scientific names used for Bolivian observations or specimens are:

Aotus trivirgatus: Heltne et al., 1976: table 2 ("reliable reports" from near Cobija). Pook and Pook, 1982: 199 (Pando). Freese et al., 1982: 68 (observations at Cobija). Wolfheim, 1983: 243 (in reference to Cobija). Kohlhaas, 1988: 95 (seen in northwestern Pando). Buchanan-Smith, 1990: 205 (observed near 1111/6842).

Aotus nigriceps: Hershkovitz, 1983: 214 (map with numbered Bolivian localities, but no list of these). Anderson, 1985b: 8 (name in list). Brown and Rumiz, 1985: 342 (summary). Tarifa, 1991: 73 (name in list, summary of status). Anderson, 1993: 27 (three localities in Pando).

Aotus azarae: Iseki et al., 1985: 18 (Chivé).

Aotus sp.: Cameron et al., 1989: 64 (reported from Pando).

LOCALITIES (3) AND SPECIMENS (4): **Pando:** 1118/6846, río Nareuda area, 1 La Paz; 1120/6908, Centro Grande, 1 AM; 1223/6835, Chivé, 1 AM, 1 (Iseki et al., 1985).

SUBFAMILY ATELINAE GRAY, 1825

Genus *Ateles* É. Geoffroy Saint-Hilaire, 1806

This subfamily was recognized by Groves (*in* Wilson and Reeder, 1993: 256) for *Ateles*, *Brachyteles*, and *Lagothrix*.

Ateles chamek (Humboldt), 1812

Spider Monkey, Mono Arana, Marimono, Coata Negro

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Simia chamek* was described by Humboldt (1812: 353); type locality Peru, restricted to "Río Comberciato, a tributary of Río Urubamba, Cuzco, Peru" by Kellogg and Goldman (1944: 17). *Ateles geoffroyii* was described by Kuhl (1820: 26), type locality San Juan del Norte, Nicaragua. *Ateles ater* was described by Cuvier (1823: 1, plate 41); type locality Ceyenne, French Guiana. *Simia Paniscus* was described by Linnaeus (1758: 26); type locality "America meridionali: Brasilia." *Ateles belzebuth* was described by É. Geoffroy Saint-Hilaire (1806a: 272); type locality not originally indicated, restricted by Kellogg and Goldman (1944: 21) to "Esmeralda, west of the mouth of Río Guapo, on Río Orinoco, and south of Mount Duida," Venezuela.

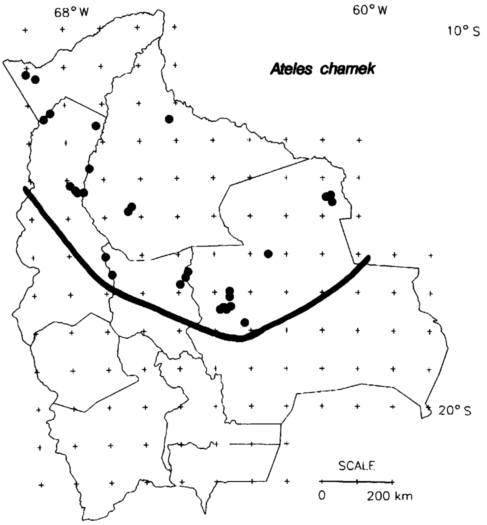


Fig. 631. Localities of known occurrence of *Ateles chamek*.

In their recent tentative revision, Froehlich et al. (1991: 18) noted that "a preferable systematic arrangement might separate the karyotypically distinct *paniscus* taxon ... from all others, especially *chamek*, which exhibits somewhat similar pelage patterns. The latter would become a subspecies of Amazonian *belzebuth* ...."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 10 and 11 are of specimens from Buenavista (ANSP 14244) and the río Yapacaní (CM 2772–2775, FM 21386, 51872).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 631.

HABITAT: High forest.

HABITS AND BEHAVIOR: Troops were observed near Ixiamas (4) and near El Triunfo (1) by Heltne et al. (1976: table 3). In table 4, these authors estimated the densities of troops and individuals per square kilometer at El Triunfo to be 0.4 and 2.0, respectively;

at Ixiamas these densities were 1.7 and 8.5. The mean group size and standard deviation for 56 observations of groups at the EBB by García and Tarifa (1989: 98) was 24.6 ± 12.8. "Upwards of 80 spider monkeys per square kilometer" were reported, without details, in the Noel Kempff National Park (Stolzenburg, 1995: 28).

No Bolivian data are available on food or reproduction.

CONSERVATION STATUS: Regarded as threatened (CITES, Appendix II). "Almost certainly extinct ... between the Rio Acre and the Rio Tahuamanu" (Izawa and Bejarano, 1981: 3) as the result of overhunting, and subject to increasing pressure elsewhere.

Scientific synonyms used for Bolivian specimens are:

Sapajou geoffroyii: Slack, 1862: 511 ("Bolivia," Smithsonian no. 3252).

Ateles Paniscus: Pelzeln, 1883: 9 (río Mamoré).

Ateles paniscus: Elliot, 1913, vol. 2: 28 (río Mamoré). Heltne et al., 1976: table 2 (observations at Ixiamas and El Triunfo; "reliable reports" at Cobija and Riberalta). Bejarano, 1980: 690 (general map). Izawa and Bejarano, 1981: 3 (notes from Pando). Freese et al., 1982: 68 (reported near Riberalta in the Beni, near Cobija in Pando, and seen near El Triunfo in the Beni and Ixiamas in La Paz). Wolfheim, 1983: 254 (cited earlier Bolivian reports). Cabot et al., 1986: 42 (name in list). Tello, 1986: 17 (Toitetú = Totaitu, observed at Los Palmares, reports from other places). García and Braza, 1987: 338 (observed in the Beni Biological Reserve). Braza and García, 1988: 182 (observations in Huanchaca area of northern Santa Cruz). García and Tarifa, 1989: 98 (observations at EBB). Kohlhaas, 1988: 95 (seen in captivity only in northwestern Pando). Cameron et al., 1989: 64 (reported in Pando). Eisenberg, 1989: 257 (mentioned that the genus *Ateles* ranges south to Bolivia; but, perhaps as a lapsus, mentioned that *paniscus* extends south "to the Amazon River" only). Bates et al., 1989: 237 (brief mention of observation at Los Fierros and Arroyo del Encanto). Emmons and Feer, 1990: 130 (mentioned Bolivia). García and Tarifa, 1991: 6 (EBB). Ergueta and Salazar, 1991: 17 (general summary). Emmons, 1991: 72 (seen at Alto río Madidi, 13 km W of Ixiamas, and Calabatea, all in La Paz department). Tarifa, 1993: 12 (status in Beni).

Ateles ater: Lönnberg, 1940c: 10 (Puerto Salinas, Desierto). Arce Pereira et al., 1963: 151 (name in list; río Chapare, Todos Santos).

Ateles paniscus chamek: Kellogg and Goldman, 1944: 17 (first use of name combination). McLaren et al., 1984: 494, río Yapacaní). Anderson, 1985b: 9 (name in list). Brown and Rumiz, 1986: 351 (summary). Suárez Morales, 1986: 41 (name in list). Tarifa, 1991: 74 (name in list, summary of status). Anderson et al., 1993: 33 (vicinity of Santa Cruz de la Sierra).

Ateles spaniscus: Stearman, 1990: 380 (misspelling; Yuquí camp at 1647/6457).

Ateles belzebuth chamek: Froehlich et al., 1991: 18 (grouped *chamek* with the Brazilian species *belzebuth*). Anderson, 1993: 28 (general distributional records).

Ateles chamek: Groves, 1989: 129. Groves *in* Wilson and Reeder, 1993: 257.

LOCALITIES (33) AND SPECIMENS (93): **Beni:** 1226/6511, río Mamore, 1 AM; 1342/6723, Desierto, 2 Stockholm (Lönnberg, 1940c); 1420/6733, Puerto Salinas, 3 Stockholm (Lönnberg, 1940c); 1444/6615, Campamento 08, 1 MNLP; 1451/6621, Estación Biológico del Beni, 1 IE, 1 MNLP; 1451/6621, El Porvenir, 1 EBD; coordinates uncertain, río Mamoré, 1 (Pelzeln, 1883). **Cochabamba:** 1602/6700, Santa Helena, 1 US; 1630/6650, San Antonio, río Cotacajes, 1 CBF; 1647/6457, Campamento Yuqui, 1 MNLP. **La Paz:** 1234/6710, Santa Ana de Madidi, 1 CBF; 1409/6755, Tumupasa, 3 AM; 1416/6747, 18 km SE of Tumupasa, 2 AM; 1420/6743, 20 km NW of San Buenaventura, 1 AM. **Pando:** 1111/6902, Mucden, 1 AM; 1118/6846, río Nareuda area, 1 AM; 1213/6824, Santa Rosa, 1 AM, 1 CBF; 1223/6835, Chivé, 1 MSB. **Santa Cruz:** 1427/6046, 9 km from Los Fierros, on Precámbrio road, 1 EBD; 1430/6054, 5 km from Los Fierros, on Precámbio road, 1 EBD; 1438/6044, 27.5 km S of Campamento Los Fierros, 1 MNK; 1600/6230, Totaitu, 1 MNK; 1627/6444, río Ichilo, 51 km S of mouth of río Chapare, 2 AM; 1636/6448, río Ichilo, 70 km S of mouth of río Chapare, 7 AM; 1658/6335, 15 km N of Santa Rosa, 1 EBD; 1722/6333, río Palometa, 1 CM; 1707/6335, province of Sara, 5 BM (Napier, 1976); 2 BZM (Pusch, 1941); 1724/6344, 7 km N and 17 km W of Buenavista, 1 AM; 1724/6346, río Yapacaní, 1 BM (Napier, 1976), 4 CM, 4 FM; 1727/6340, Buenavista, 4 AM, 3 ANSP, 8 BM (Napier, 1976), 2 FM, 1 MACN (not examined); 1727/6351, río Isamo, 1 MACN (not examined); 1748/6310, Santa Cruz de la

Sierra, 1 BM (Napier, 1976); 2 BZM (Pusch, 1941); coordinates uncertain, province de Guarayos, 2 Paris (I. Geoffroy Saint-Hilaire, 1851). **Department unknown:** "Bolivia" only, 4 BM (Napier, 1976), 4 MNLP, 4 US.

SUBFAMILY CALLICEBINAE POCOCK, 1925

Sahui Boliviano, Mono Orobasso

Genus *Callicebus* Thomas, 1903

The subfamily Callicebinae Pocock, 1925, was recognized by Groves (*in* Wilson and Reeder, 1993: 258) for this genus alone. All Bolivian *Callicebus* are regarded as threatened (CITES, Appendix II).

Callicebus brunneus
(Natterer *in* Wagner), 1842

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Callithrix brunea* was described by Natterer (*in* Wagner, 1842a: 357); type locality not given by author, restricted to "Salto de Bananeira, Mamore River, Mato Grosso, Brasil," by Hershkovitz (1963a: 32), or "Cachoeira da Bananeira, Rio Guaporé, upper Rio Madeira, Rondônia" (Hershkovitz, 1990: 59, quoting Pelzeln, 1883: 20). *Callithrix cuprea* was described by Spix (1823: 23); type locality "sylvis Solimoens," or Solimes River, Amazonas, Brazil, near the Peruvian border, restricted by Hershkovitz (1963a: 36) to Tabatinga.

Morphological Characters and Comparisons: No measurements of Bolivian specimens are available.

Distributional Notes: Known localities are listed below and mapped in figure 632. Hershkovitz (1963a: 32) noted that *C. m. brunneus* ranged "east to the Rio Beni in the department of Beni, Bolivia." The only Bolivian localities cited were the type localities of *brunneus*, *olallae*, and *modestus*.

Habitat: Barbecho, especially Barbecho tupido (secondary forest with incomplete canopies and thick bamboo, vines, and grass) were sites of observations by Izawa and Yoneda (1981: 19). Observed infrequently in denser forest.

Habits and Behavior: Home range was estimated as 10 to 20 hectares by Izawa and Yoneda (1981: 19). They reported the number of individuals in 152 observations of groups as ranging from 1 to 5 (average 2.5). Seven troops were observed near Cobija by Heltne et al. (1976: table 3). In table 4, these authors estimated the densities of troops and individuals per square kilometer to be 4.9 and 14.7, respectively. In 1986 near Cobija, Kohlhaas (1988) estimated density of groups to average 2.52 per km^2 or 6.45 individuals per km^2, with the mean group size 2.56 (range 1–4). Cameron et al. (1989: 64) estimated density of groups to average 2.4 per km^2 and individuals to average 7.2 per km^2. Inhabit lowland tropical rain forest (Izawa, 1980e). In 5 of 28 observations of *Callicebus cupreus* by Cameron et al. (1989: 66), these animals were associated with from one to three other species, among them *Saguinus fuscicollis*, *S. labiatus*, and *Callimico goeldii.*

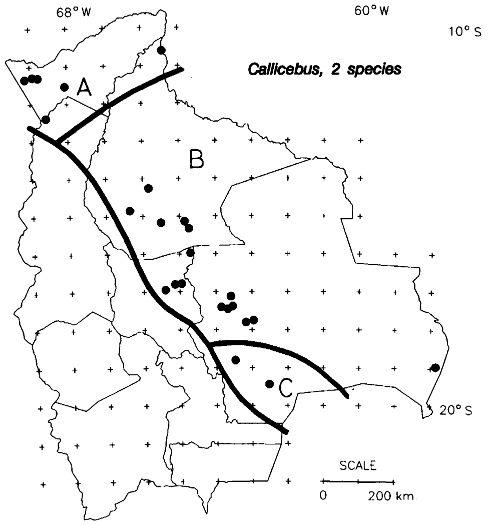


Fig. 632. Localities of known occurrence of three taxa of *Callicebus*, *C. brunneus* (A), *C. donacophilus donacophilus* (B), and *C. donacophilus pallescens* (C).

Food: Field observations and examination of the contents of three stomachs indicate omnivory; fruit, flowers, leaves, ants, and other insects were eaten (Izawa and Yoneda, 1981: 16).

Reproduction: No data.

Conservation Status: Regarded as threatened (CITES, Appendix II), as noted under genus above.

Scientific synonyms used for Bolivian specimens are:

Callithrix brunea: Pelzeln, 1883: 20.

Callicebus gigot donacophilus: Hill, 1960: 115 (part, mapped all of the Bolivian range of *Callicebus* under this name).

Callicebus moloch brunneus: Hershkovitz, 1963a: 32 (see distributional note above). Jones and Anderson, 1978: 2. Kinzey, 1982: 42 of microfiche. Anderson, 1985b: 9 (name in list). Brown and Rumiz, 1986: 344 (summary). Suárez Morales, 1986: 40 (name in list). Minezawa et al., 1989: 81 (within 4 km of Montecarlo). Emmons and Feer, 1990: 111 (mapped in Bolivia). Tarifa, 1991: 73 (name in list, summary of status).

Callicebus moloch: Heltne et al., 1976: table 2 (observed at Ixiamas and río Acre). Bejarano, 1980: 692 (general map). Izawa and Yoneda, 1981: 16 (observation in Pando). Izawa, 1980e: 47 (photos and ecology in Pando). Freese et al., 1982: 68 (seen near Cobija in Pando and near Ixiamas in La Paz, ambiguous reports near Riberalta in Beni). Pook and Pook, 1982: 200 (Pando). Tello, 1986: 15 (observed at the "Laguna Bay—Manuripi River confluence" in the Reserva Nacional de Fauna Manuripi Heath). Buchanan-Smith, 1990: 205 (observed near 1111/6842). Emmons, 1991: 72 (seen at Alto río Madidi in La Paz department).

Callicebus brunneus: Hershkovitz, 1988: 242 (mentioned, but did not document, sympatry with *C. cupreus* and with *C. caligatus*). Hershkovitz, 1990: 4 (map with numbered Bolivian localities, list in terminal gazetteer; possible instances of sympatry mentioned but not discussed on p. 44). Kobayashi, 1990: 121 (studied dentition of specimens at AMNH); 1991: 535 (studied cranial sizes, did not list specimens); 1995: 103 (studied 9 AMNH specimens). Anderson, 1993: 27 (general distributional records).

Callicebus cupreus: Cameron et al., 1989: 64 (reported in Pando).

LOCALITIES (6) AND SPECIMENS (9): **Beni:** 1036/6525, Cachoeira da Bananeira, 4 Vienna (Wagner, 1842b). **Pando:** 1117/6855, río Nareuda, 1 AM; 1118/6846, río Nareuda area, 1 FM; 1120/6908, Centro Grande, 1 La Paz; 1132/6803, Montecarlo (Minezawa et al., 1989); 1223/6835, Chivé, 1 AM.

Callicebus donacophilus (d'Orbigny), 1835

TAXONOMIC REMARKS: Hershkovitz (1988: 242) listed two subspecies for *C. donacophilus* but did not list specimens or localities for them. Subsequently, he (Hershkovitz, 1990: 49) restricted the subspecies to Paraguay and Brazil and referred his Bolivian material to *C. d. donacophilus*. However, he had not seen the four specimens here referred to *C. d. pallescens*. *Callicebus pallescens* was described by Thomas (1907b: 161), type locality "30 miles [= 48 km] N of Concepcion," in the Chaco of Paraguay). With so few specimens, these subspecific assignments remain quite tentative.

KARYOLOGY: The diploid chromosome number is 50. "Their autosomes consist of 6 pairs of subtelocentric, 5 pairs of submetacentric or metacentric and 13 pairs of acrocentric chromosomes. The X-chromosome and the Y-chromosome of this species are submetacentric and metacentric, respectively" (Minezawa and Valdivia Borda, 1984a: 41).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 632.

HABITAT: Areas with trees and shrubs.

HABITS AND BEHAVIOR: It is timid and lives ordinarily in pairs (d'Orbigny and Gervais, 1847: 10). The mean group size and standard deviation for 15 observations of groups at the EBB by García and Tarifa (1988: 98) was 2.9 ± 0.5.

No specific Bolivian data available on food or reproduction.

CONSERVATION STATUS: Noted above.

Scientific synonyms used for Bolivian specimens are given under the subspecies below.

Callicebus donacophilus donacophilus (d'Orbigny), 1836

Callithrix donacophilus d'Orbigny, 1836, plate 5 (according to Sherborn and Griffin, 1934: 130, plate 5 was published in 1835, although it was cited as 1836 by d'Orbigny and Gervais, 1847: 10; type locality Province of Moxos, Beni, Bolivia; lectotype from Santa Cruz de la Sierra, Rode, 1938). I. Geoffroy Saint-Hilaire, 1851: 40. Gerrard, 1862: 26 (3 specimens from Bolivia, Bridges coll.).

Callithrix donacophila: Schlegel, 1876: 240 (Santa Cruz de la Sierra).

Callicebus donacophilus: Elliot, 1913, vol. 1: 249 (Sara). Osgood, 1916: 214 (Todos Santos). Rode, 1938: 234. Hill, 1960: 142 (cited Osgood). Hershkovitz, 1988: 242. Hershkovitz, 1990: 4 (map with numbered Bolivian localities and list of these in gazetteer on p. 98; "possibly partial" sympatry with *C. brunneus* mentioned on p. 44, but not discussed).

Callithrix cinerascens: Rode, 1938: 234 (catalogue of types, Santa Cruz de la Sierra).

Callicebus gigot donacophilus: Hill, 1960: 115 (part, mapped all Bolivian area for *Callicebus* under this name).

Callicebus moloch donacophilus: Cabrera, 1958: 140. Hershkovitz, 1963a: 26 (Todos Santos, and other localities in Beni and Santa Cruz on p. 75). Pilleri, 1979: 248 (photos of young monkey in captivity, seen on río Mamoré shortly above río Grande). Kinzey, 1982: 42 of microfiche. Minezawa and Valdivia Borda, 1984a: 39 (near Santa Cruz). Anderson, 1985b: 9 (name in list). Iseki et al., 1985: 18 (San Miguel). Brown and Rumiz, 1986: 345 (summary). Emmons and Feer, 1990: 111 (mapped in Bolivia). Tarifa, 1991: 73 (name in list, summary of status).

Callicebus donacophillos: Arce Pereira et al., 1963: 152 (name in list; río Chapare, Todos Santos).

Callicebus moloch: Napier, 1976: 54 (Buenavista, province of Sara, and "Bolivia" only). Cabot et al., 1986: 42 (name in list). Suárez Morales, 1986: 87 (EBB). García and Braza, 1987: 338 (observed in the Beni Biological Reserve). García and Tarifa, 1989: 98 (observations at EBB). Stearman, 1990: 380 (Yuquí camp at 1647/6457). García and Tarifa, 1991: 9 (EBB). Parker et al., 1993: 46 (seen at the Jardín Botanico near Cotoca).

Callicebus moloch donacephilus: McLaren et al., 1984: 482 (Buenavista, Puerto Suárez, Santa Cruz de la Sierra).

Callicebus donacophilus donacophilus: Hershkovitz, 1987b: 74 (Moxos); 1988: 242; 1990: 47. Anderson, 1993: 27 (general distributional records). Anderson et al., 1993: 31 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (16) AND SPECIMENS (82): **Beni:** 1415/6550, Venecia, 1 EBD; 1451/6621, Reserva Biológica del Beni, 5 EBD; 1508/6451, 10 km E San Antonio de Lora, 5 AM; 1510/6530, province of Moxos, 1 Paris (d'Orbigny, 1835); 1519/6444, Camiaco, 3 AM. **Cochabamba:** 1558/6442, mouth of río Chapare, 7 ANSP; 1647/6457, Campamento Yuqui, 1 MNLP; 1648/6508, Todos Santos, 1 AM; 1657/6524, San Antonio, 2 AM. **Santa Cruz:** 1707/6335, province of Sara, 3 BM (Napier, 1976); 1723/6332, San Miguel (Rincón?), 2 (Iseki et al., 1985); 1724/6351, río Surutú, 1 AM, 1 MCZ (not seen), 1 MACN (not seen); 1727/6340, Buenavista, 2 AM, 3 ANSP, 6 BM, 2 CM, 1 FM, 8 MACN (not seen); 1745/6257, Cotoca, 1 MNK; 1748/6310, Santa Cruz de la Sierra, 2 AM, 3 CM, 2 EBD, 3 Paris (I. Geoffroy Saint-Hilaire, 1851), 1 MACN (not seen); 1857/5751, Puerto Suárez, 1 CM. **Department unknown:** "Bolivia" only, 1 ANSP, 4 BM (Napier, 1976), 3 La Plata; Bolivia perhaps, 1 BM (Napier, 1976; 4 MNLP; subspecies not known).

Measurements in tables 10 and 11 are of specimens from 10 km E of San Antonio (AM 211490–211494), and Buenavista (BM 1926.12.4.6, 7.8.2.12, CM 2741, ANSP 14247, 14248, FM 25263).

Callicebus donacophilus pallescens Thomas, 1907

Callicebus pallescens: Krieg, 1930: 764 (seen north of río Grande along road north to Santa Cruz and thence eastward).

Callicebus donacophilus pallescens: Hershkovitz, 1988: 242 (in taxonomic list); 1990: 49. Kobayashi, 1990: 121 (dentition); 1995: 103 (studied 9 AMNH specimens). See taxonomic notes under the species.

Callicebus moloch: Parker et al., 1993: 102 (reported by local people at Curuyuqui and Perforación).

LOCALITIES (2) AND SPECIMENS (4): **Santa Cruz:** 1848/6328, 3 km N Avapo and 7 km S of río Grande, 1 AM; 1926/6231, río Parapeti, Guaripembi, 3 EBD.

Callicebus modestus Lönnberg, 1939

TAXONOMIC REMARKS: The specific status of both *Callicebus modestus* and *C. olallae* needs further study.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in table 5 are of the holotype (Stockholm 135). Hershkovitz (1990) published photographs of the skull of the holotype and noted its elongation. He wrote that *Callicebus modestus* differs from *C. brunneus* "by generally paler coloration, forehead reddish brown agouti, ear tufts whitish, outer surface of limbs not blackish." If a series of *Callicebus* from the Beni River valley could be obtained and studied, a better

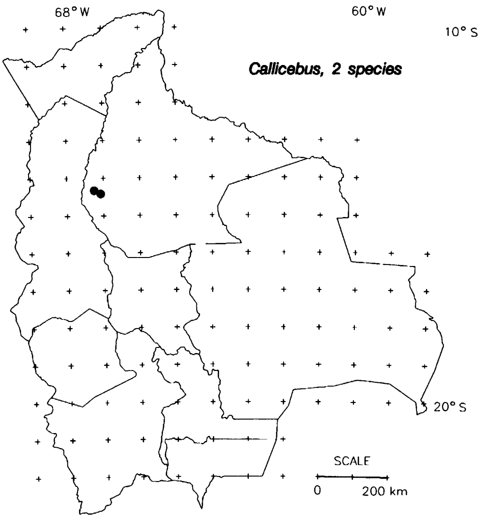


Fig. 633. Localities of known occurrence of two nominal species of *Callicebus*, *C. modestus* (left dot) and *C. olallae* (right dot).

understanding of variability would be gained and the present hypothesis of specific distinctness of *C. modestus* and *C. olallae* could be tested more rigorously.

DISTRIBUTIONAL NOTES: The only known locality is noted below and mapped in figure 633.

No data are available on habitat, habits, behavior, food, or reproduction.

CONSERVATION STATUS: Noted above.

Scientific synonyms are:

Callicebus modestus Lönnberg, 1939: 17 (type locality "Bolivia, rio Beni, El Consuelo"). Hershkovitz, 1988: 242; 1990: 46 (see note under Morphology above). Kobayashi, 1990: 121 (dentition); 1991: 535 (studied cranial sizes, did not list specimens); 1995: 103 (phylogenetics, studied one specimen). Groves *in* Wilson and Reeder, 1993: 258. Anderson, 1993: 27 (El Consuelo).

Callicebus moloch brunneus: Hershkovitz, 1963a: 75 (*modestus* listed as synonym).

Callicebus moloch modestus: Emmons and Feer, 1990: 111 (mapped in Bolivia).

LOCALITIES (1) AND SPECIMENS (2): **Beni:** 1420/6715, El Consuelo, 2 Stockholm (Lönnberg, 1939).

Callicebus olallae
Lönnberg, 1939

TAXONOMIC REMARKS: See notes under *C. modestus* above.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in table 5 are of the holotype (Stockholm 187).

DISTRIBUTIONAL NOTES: The only known locality is noted below and mapped in figure 633.

No data are available on habitat, habits, behavior, food, or reproduction.

CONSERVATION STATUS: Noted above.

Scientific synonyms are:

Callicebus olallae Lönnberg, 1939: 16 (type locality "Bolivia, río Beni, La Laguna, una legua de [5 km from] Santa Rosa."). Kobayashi, 1990: 121 (dentition); 1991: 535 (studied cranial sizes, did not list specimens); 1995: 103 (phylogenetics, studied one specimen).

Callicebus moloch brunneus: Hershkovitz, 1963a: 75 (*olallae* listed as synonym).

Callicebus moloch olallae: Emmons and Feer, 1990: 111 (mapped in Bolivia).

Callicebus olallae: Hershkovitz, 1988: 242; 1990: 49 (one specimen). Groves *in* Wilson and Reeder, 1993: 258.

Callicebus ollallae: Anderson, 1993: 27 (a misspelling, La Laguna).

LOCALITIES (1) AND SPECIMENS (1): **Beni:** 1425/6704, La Laguna, 1 Stockholm (Lönnberg, 1939).

Callicebus, undetermined species

Department unknown: Bolivia, 7 MACN (not examined).

SUBFAMILY CEBINAE MIVART, 1865

Genus *Cebus* Erxleben, 1777

The subfamily Cebinae Bonaparte, 1831, was used by Groves (*in* Wilson and Reeder, 1993: 159) for *Cebus* and *Saimiri*.

All Bolivian species of *Cebus* are regarded as threatened (CITES, Appendix II).

Cebus albifrons (Humboldt), 1812

White-fronted Monkey, Mono de Frente Blanca

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Simia albifrons* was described by Humboldt (1812: 324), type locality Orinoco drainage basin, Venezuela. *Cebus flavescens cuscinus* was described by Thomas (1901a: 179), type locality Callanga,

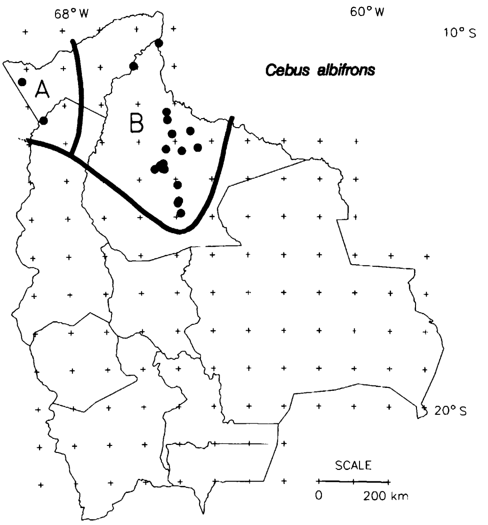


Fig. 634. Localities of known occurrence of two subspecies of *Cebus albifrons*, *C. a. cuscinus* (A) and *C. albifrons unicolor* (B).

Cuzco, Peru. Hershkovitz (1949a: 376) first used the name combination *Cebus albifrons cuscinus*. *Cebus unicolor* was described by Spix (1823: 7), type locality forests of Rio Tefé near its mouth in Amazonas, Brazil. Hershkovitz (1949a: 372) first used the name combination *Cebus albifrons unicolor*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Specimens measured for tables 10 and 11 are noted under subspecies.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 634.

HABITAT: High forest was the preferred habitat in Pando (Izawa and Bejarano, 1981: 5).

HABITS AND BEHAVIOR: Rarely found associated with *Saimiri sciureus* (Izawa and Bejarano, 1981: 5). Cameron et al. (1989: 64) estimated density of groups to average 0.2 per km^2 and individuals to average 0.9 per km^2.

FOOD: An omnivorous diet was reported in Pando by Izawa and Yoneda (1981: 16), based on contents of two stomachs examined.

REPRODUCTION: No data.

KARYOLOGY: No Bolivian data. Diploid chromosome number is 54 (García et al., 1976: 314, study of two females from a zoo). Scientific synonyms used for Bolivian specimens are given under subspecies below.

Cebus albifrons cuscinus Thomas, 1901

Cebus albifrons cuscinus: Hill, 1960: 443 (mapped into Bolivia, west of río Beni, but listed no specific locality for Bolivia). Anderson, 1985b: 9 (name in list). Brown and Rumiz, 1986: 346 (summary). Suárez Morales, 1986: 40 (name in list). Tarifa, 1991: 73 (name in list, summary of status). Anderson, 1993: 28 (general distributional records).

Cebus albifrons: Heltne et al., 1976: table 2 (observed near Cobija). Pook and Pook, 1982: 199 (Pando). Freese et al., 1982: 68 (observed at Cobija and Riberalta). Iseki et al., 1985: 18 (Araonas in La Paz and Chivé in Pando). Suárez Morales, 1986: 86 (Estación Biológica Beni). Cameron et al, 1989: 64 (observations in Pando). Eisenberg, 1989: 249 (mentioned "northern Bolivia"). Emmons and Feer, 1990: 118 (mentioned Bolivia).

LOCALITIES (3) AND SPECIMENS (4): **La Paz:** 1230/6830, Araonas, 1 (Iseki et al., 1985). **Pando:** 1120/6908, Centro Grande, 1 AM, 1 La Paz; 1223/6835, Chivé, 1 (Iseki et al., 1985).

The assignment of these specimens to *C. a. cuscinus* is rather arbitrary and on geographic grounds. The two specimens from Centro Grande are partial skins only.

Cebus albifrons unicolor Spix, 1823

Cebus albifrons unicolor: Hill, 1960: 443 (mapped the geographic range of the species into Bolivia, south to near Santarosa, but listed no specific locality for Bolivia). Anderson, 1985b: 9 (name in list). Brown and Rumiz, 1986: 347 (summary). Tarifa, 1991: 73 (name in list, summary of status). Anderson, 1993: 28 (general distributional records).

Cebus albifrons; Cabot et al., 1986: 42 (name in list). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area).

LOCALITIES (21) AND SPECIMENS (55): **Beni:** 1023/6524, río Beni, lower part, 2 US; 1059/6606, Riberalta, 3 FM; 1213/6513, on bank of river opposite Cascajal, 1 AM; 1226/6512, mouth of río Mayosa, 1 AM; 1244/6435, río Machupo, 20 km above Horquilla, 3 AM; 1248/6505, Puerto Siles, 5 AM; 1310/6423, Veinte y Dos, 2 AM; 1312/6515, 13 km (8 mi) N Exaltación, 9 AM; 1315/6449, Yutiole, 2 AM; 1335/6520, río Mamoré, 2 AM; 1338/6523, mouth of río Yacuma, 2 AM; 1338/6525, río Yacuma, 1.5 km from mouth, 4 AM; 1342/6519, río Mamoré, 4 km below mouth of río Apere, 2 AM; 1343/6521, Puerto Caballo, 3 AM; 1344/6518, río Apere, 1 km from mouth, 1 AM; 1344/6534, río Yacuma, 4 km from Santa Ana, 2 AM; 1409/6457, río Tijamuchi, 2 km from mouth, 1 AM; 1434/6455, 23 km W of San Javier, 1 AM; 1437/6457, mouth of río Ibare, 2 AM; 1438/6457, río Ibare, 1 km above mouth, 3 AM; 1454/6452, 17 km SE of Puerto Julio, 1 AM. **Department unknown:** perhaps Bolivia, 3 MNLP.

Measurements in tables 10 and 11 are of specimens from 8 km N of Exaltación (AM 211550–211557).

Cebus apella (Linnaeus, 1758)

Brown Capuchin, Mono Común

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Simia apella* was described by Linnaeus (1758: 28); type locality not originally designated, restricted by implication of various authors to French Guiana. *Cebus Apella, β Paraguayanus* was described by Fischer (1829: 47); type locality Paraguay, restricted to the "Brazo norte del Pilcomayo, por su proximidad a Asunción," Paraguay, by Cabrera (1958: 166). The name *Cebus flavus* was used by Elliot (1913, vol. 2: 93); the type locality was said to be "le Bresil" and the name was attributed to É. Geoffroy Saint-Hilaire (1812). The name *flavus* may belong in the synonymy of *Cebus albifrons* rather than *C. apella*. *Cebus azarae* was described by Rengger (1830: 26) type locality not specific, Paraguay and Brazil were mentioned. *Cebus elegans* was described by I. Geoffroy Saint-Hilaire (1850: 875), type locality "Du Bresil at du Perou." *Cebus griseus* was described by Desmarest (1820: 81); type locality unknown. *Cebus libidinosus juruanus* was described by Lönnberg (1939: 15), type locality Jurua River, Brazil.

Karyology: Based on study of 9 males and 12 females from the vicinity of Santa Cruz de la Sierra, the diploid chromosome number is 54 (Cambefort and Moro, 1978; Minezawa and Valdivia Borda, 1984b: 55).

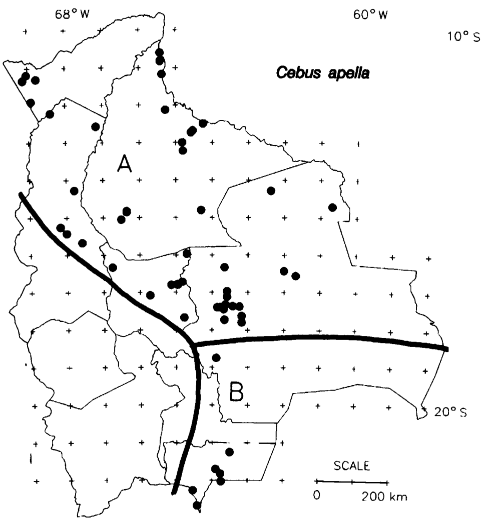


Fig. 635. Localities of known occurrence of two subspecies of *Cebus apella*, *C. a. pallidus* (A) and *C. a. paraguayanus* (B).

Distributional Notes: Known localities are listed below and mapped in figure 635.

Habitat: In Pando, occupied four types of vegetation, but was more common in low forest and second growth ("Monte bajo" and "Barbecho") (Izawa and Bejarano, 1981: 5).

Habits and Behavior: Often found with *Saimiri sciureus* (Izawa and Bejarano, 1981: 5). Troops were observed near Cobija (2), San José (1), and El Triunfo (21) by Heltne et al. (1976: table 3). In table 4, these authors estimated the densities of troops and individuals per square kilometer at Cobija to be 0.7 and 7.0, respectively; at San José these densities were 0.2 and 2.0; and at El Triunfo 5.5 and 55.0. In northwestern Pando, *C. apella* was observed 5 times in 52.5 hours by observers walking over 212 km of trails. This is 0.95 per 10 hours or 0.24 per 10 km (Yoneda, 1983b: 48). Corresponding figures for 18 hours and 51 km of observation in southwestern Pando were 1.11 per 10 hours and 0.39 per km. On the Quiquibey River, figures for 34 hours and 25 minutes and 63.6 km were 0.12 per 10 hours and 0.63 per 10 km. The camp site on the Quiquibey was 10 km above its mouth (Yoneda, 1984e). The mean group size and standard deviation for

82 observations of groups at the Estación Biológica del Beni by García and Tarifa (1989: 98) was 17.1 ± 9.4. Cameron et al. (1989: 64) estimated density of groups in Pando to average 0.6 per km^2 and individuals to average 3.3 per km^2. In 3 of 19 observations of *Cebus apella* by Cameron et al. (1989: 66), these animals were associated with *Saimiri boliviensis*.

FOOD: An omnivorous diet in Pando was reported by Izawa and Yoneda (1981: 16), based on contents of eight stomachs examined.

REPRODUCTION: No useful data.

Scientific synonyms used for Bolivian specimens are given under the subspecies below:

Cebus apella pallidus Gray, 1865

Cebus fulvus d'Orbigny and Gervais, 1847: 9 (type locality Santa Cruz de la Sierra; preoccupied by *fulvus* Kerr, 1792, = *Cebus apella apella* according to Cabrera, 1958: 163). Cabrera, 1917: 13 (Santa Cruz).

Cebus flavus: I. Geoffroy Saint-Hilaire, 1851: 45 (province of Santa Cruz). Schlegel, 1876: 205. Elliot, 1913, vol. 2: 93 ("Bolivia," perhaps this taxon).

Cebus pallidus Gray, 1866b: 826 (type locality restricted by Gray, 1870: 49 ["Bolivia," Bridges]; and further restricted by Cabrera, 1958: 166, to "rio Beni"). Schlegel, 1876: 205 (cited Gray, also Santa Cruz de la Sierra). Arce Pereira et al., 1963: 151 (name in list; río Chapare, Todos Santos).

Cebus elegans: Gray, 1866b: 826 ("Bolivia"). Pelzeln, 1883: 12 (Cachoeira da Bananeira).

Cebus Azarae: Burmeister, 1869: 447 (Santa Cruz de la Sierra).

Cebus azarae: Elliot, 1913, vol. 2: 107 (Santa Cruz de la Sierra). Krieg, 1930: 775 (seen at San José de Chiquitos).

Cebus azarae pallidus: Elliot, 1913, vol. 2: 108 ("Bolivia").

Cebus apella griseus: Pusch, 1941: 203 ("Bolivia," perhaps eastern Bolivia, because the preparator, Bridges, collected in that area; Buenavista, Yungas of Cochabamba).

Cebus apella sagitta Pusch, 1941: 209 (type locality Chimati, La Paz, Bolivia, and from Mapiri).

Cebus apella juruanus Pusch, 1941: 200 (12'S, 69'W).

Cebus apella: Soria, 1957a: table 1 (Santa Cruz, MACN 33.156, and Buenavista, MACN 50.162). Napier, 1976: 40 (Yungas of Cochabamba, province of Sara). Heltne et al., 1976: table 2 (observed at Cobija and El Triunfo). Cambefort and Moro, 1978: 308 (karyotype, Santa Cruz de la Sierra). Bejarano, 1980: 696 (general map). Freese et al., 1982: 68 (seen near Riberalta and El Triunfo in the Beni, near Ixiamas in La Paz, and near Cobija in Pando, and near San José in Santa Cruz). Pook and Pook, 1982: 199 (Pando). Minezawa and Valdivia Borda, 1984b: 55 (near Santa Cruz). Iseki et al., 1985: 18 (Colonia Piray). Cabot et al., 1986: 42 (name in list). Suárez Morales, 1986: 87 (Estación Biológica de Beni). Tello, 1986: 16 (observations at Zapoco, Los Palmares, and the río Manuripi near Laguna Bay). García et al., 1987: 15 (Estación Biológica Beni). García and Braza, 1987: 338 (observed in the Beni Biological Reserve). García and Tarifa, 1989: 98 (observations at EBB). Braza and García, 1988: 182 (observations in Huanchaca area of northern Santa Cruz). Cameron et al, 1989: 64 (observations in Pando). García and Tarifa, 1991: 6 (Estación Biológica Beni). Ergueta and Salazar B., 1991: 16 (general summary). Emmons, 1991: 72 (seen at Alto río Madidi and 13 km W of Ixiamas in La Paz department). Parker et al., 1993: 46 (seen in Jardín Botanico near Cotoca). Vargas and Méndez, *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area).

Cebus apella pallidus: Cabrera, 1958: 166 (first use of name combination; northern and central Bolivia). Hill, 1960: 475. Cambefort and Moro, 1978: 309 (karyotype; between 1720/6337 and 1727/6334). McLaren et al., 1984: 488 (Buenavista, río Surutú, río Yapacaní, province of Sara). Anderson, 1985b: 9 (name in list). Brown and Rumiz, 1986: 347 (summary). Suarez Morales, 1986: 40 (name in list). Tarifa, 1991: 73 (name in list, summary of status). Anderson, 1993: 28 (general distributional records). Anderson et al., 1993: 32 (vicinity of Santa Cruz de la Sierra).

Cebus paraguayanus: Arce Pereira et al., 1963: 151 (name in list; río Chapare, Todos Santos).

Cebus apella paraguayanus: Hershkovitz, 1987b: 74 (Santa Cruz de la Sierra).

LOCALITIES (50) AND SPECIMENS (165): **Beni:** 1036/6525, Cachoeira da Bananeira, 1 (Pelzeln, 1883); 1049/6525, near Guayaramerin, 1 AM; 1110/6522, 4 km below Santa Cruz, 1 AM; 1208/6517, opposite El Sara, 1 AM; 1230/6415, Pampa de Meio, 1 AM; 1241/6432, río Machupo, 15 km above Horquilla, 1 AM; 1244/6435, río Machupo, 20 km above Horquilla, 1 AM; 1300/6449, 5 km

N of San Joaquín, Aguadulce, 3 FM; 1300/6449, 10 km N of San Joaquín, Aguadulce, 2 FM; 1313/6448, Barranquita, 2 FM; 1448/6418, Ibiato, 1 CBF (+ 7 CBF and 4 MNK, Townsend, in litt.); 1449/6621, Isla de Crete, 5 km N of río Curiaba, 2 EBD; 1451/6621, Estación Biológica del Beni, La Cabaña, 3 EBD; 1503/6630, Aserradero Triunfo, 28 km E and 20 km S of San Borja, 1 EBD; coordinates uncertain, Centenela, 1 FM; coordinates uncertain, río Beni (restricted type locality of *Cebus pallidus*). **Cochabamba:** 1558/6442, mouth of río Chapare, 3 ANSP; 1620/6645, yungas de Cochabamba, 9 BM; 1643/6449, río Chimoré, 1 AM, 2 CBF; 1647/6457, Campamento Yuqui, 18 MNLP; 1648/6508, Todos Santos, 1 (Osgood, 1916); 1705/6543, Valle de Pampatambo, 1 EBD; 1740/6446, Calahuasi, 1 IML. **La Paz:** 1234/6710, Santa Ana de Madidi, 1 CBF; 1416/6747, 18 km SE of Tumupasa, 1 AM; 1515/6810, Mapiri, 1 BZM (Pusch, 1941); 1525/6800, Chimati, 1 BM (Pusch, 1941); 1540/6735, Serranía Bellavista, 35 km by road N of Caranavi,1 AM. **Pando:** 1111/6902, Mucden, 1 AM, 1 FM; 1118/6846, río Nareuda area, 1 La Paz; 1120/6908, Centro Grande, 1 La Paz; 1150/6850, NW Bolivia, 1 BM (Pusch, 1941); 1213/6824, Santa Rosa, 1 CBF. **Santa Cruz:** 1417/6223, Samaipata, 3 ANSP; 1438/6045, 27.5 km S of Los Fieros, 1 MNK; 1442/6041, Km 60 E of Aserradero Moira, 2 EBD; 1620/6339, Colonia Piray, 1 (Iseki et al., 1985); 1625/6200, El Carmen, 1 MNLP; 1633/6140, Zapocoz, 3 MNLP; 1658/6335, 15 km N of Santa Rosa, 1 EBD; 1707/6335, province of Sara, 2 BM (Napier, 1976), 5 BZM (Pusch, 1941), 1 CM, 1 Hamburg (Pusch, 1941); 1720/6337, (Cambefort and Moro, 1978); 1722/6325, "Province of Santa Cruz," 3 Paris (I. Geoffroy Saint-Hilaire, 1851); 1723/6314, 3 km SE Montero, 1 km N of Villa Copacabana, 1 MSB; 1724/6346, río Yapacaní, 1 BM, 4 CM, 2 FM; 1724/6351, río Surutú, 1 AM, 7 CM, 1 MCZ (not seen); 1727/6340, Buenavista, 1 ANSP, 9 BM, 4 CM, 7 FM, 8 MACN (not examined); 1738/6310, 15 km N of Santa Cruz, 1 EBD; 1744/6339, Cerro del Amboró, 6 MACN (not examined); 1748/6310, Santa Cruz de la Sierra, 5 BZM (Pusch, 1941), 1 AM, 1 MACN (not examined).

Measurements in tables 10 and 11 are of specimens from 4 km below Santa Cruz (AM 211578), opposite El Sara (AM 211579), Pampa de Meio (AM 209926), mouth of the río Chapare (ANSP 19445), and Buenavista (BM 1926.12.4.3 to 5, 1934.9.2.3, FM 21389, 25260, 51879, 34357, 21413, ANSP 14250).

Cebus apella paraguayanus
Fischer, 1829

Cebus azarae: Thomas, 1925: 576 (Caraparí, Sierra Santa Rosa, Yacuiba). Eisentraut, 1933: 50 (near Villa Montes).

Cebus apella griseus: Pusch, 1941: 203 (Caraparí, Sierra Santa Rosa, Jacuiba).

Cebus apella azarae: Pusch, 1941: 204 (Villa Montes).

Cebus apella: Napier, 1976: 40 (Caraparí, Sierra Santa Rosa, Yacuiba). Heltne et al., 1976: table 2 (observed at San José de Chiquitos). Freese et al., 1982: 68 (seen near San José in Santa Cruz).

Cebus capella: Eisentraut, 1983: 106 (misspelling in list).

Cebus apella paraguayanus: Anderson, 1985b: 9 (name in list). Brown and Rumiz, 1986: 348 (summary). Tarifa, 1991: 73 (name in list, summary of status). Anderson, 1993: 28 (general distributional records).

Cebus apella paraguayansis: Groves *in* Wilson and Reeder, 1993: 259 (misspelling in synonymy only).

LOCALITIES (7) AND SPECIMENS (9): **Santa Cruz:** 1845/6353, 14.5 km by road NW Masicuri, 1 AM. **Tarija:** 2115/6330, Villa Montes, 1 BZM (Pusch, 1941); 2142/6354, Sierra Santa Rosa, 1 BM; 2149/6346, Caraparí, 1 BM; 2202/6345, Yacuiba, 1 BM; 2216/6433, 3 km SE of Cuyambuyo, 1 CBF; 2241/6426, río Lipeo, 3 ANSP.

Measurements in tables 10 and 11 are of specimens from 14.5 km NW of Masicuri (AM 260864) and from río Lipeo (ANSP 19182, 19183).

Cebus apella, undetermined subspecies

Specimens, 17. **Department unknown:** Bolivia only 1 BM (Pusch, 1941), 3 CM, 13 MNLP.

Cebus, not identified to species

LOCALITIES (11) AND SPECIMENS (28): **Beni:** 1305/6453, Aserradero Monte de San

Pablo, 1 MNK; 1448/6418, Ibiato, 1 CBF. **La Paz:** 1227/6737, río Manupare, 1 CBF. **Pando:** 1117/6650, río Madre de Dios, opposite Genechiquia, 1 AM; 1117/6855, río Nareuda, 3 AM; 1123/6712, Bella Vista, 1 AM; 1223/6835, Chivé, 1 AM. **Santa Cruz:** 1545/6100, Los Palmares, 1 MNK; 1600/6230, Totaitu, 3 MNK; coordinates uncertain, "Santa Cruz" only, 1 Paris (as "*Cebus castaneus,*" not seen). **Tarija:** 2115/6330, Villa Montes, 3 Frankfurt (Felten, in litt.). **Department unknown:** "Bolivia" only, 2 ANSP, 1 MSB (as "Cebidae"), 1 Paris (as "*Cebus castaneus,*" not seen), 1 Paris (as "*Cebus flavus,*" not seen), 6 MACN (not seen).

Genus *Saimiri* Voigt, 1831

Saimiri sciureus (Linnaeus), 1758

Squirrel Monkey, Mono Amarillo, Mono Ardilla

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Simia sciurea* was described by Linnaeus (1758: 29); type locality Guayana, designated by Thomas (1911c: 129), restricted by Tate (1939: 219) to Kartabo, British Guiana. The distinctive black-capped squirrel monkeys that occur in Bolivia, and in adjacent parts of Peru and Brazil to the northwest of Bolivia, have been treated as a species, *Saimiri boliviensis*, separate from *Saimiri sciureus*, a species that occurs farther north (Hershkovitz, 1984). However, evidence for intergradation between these populations has been presented (Thorington, 1985), and therefore, the Bolivian populations are here regarded as belonging to the subspecies *S. sciureus boliviensis*. Study of gene frequencies at 14 polymorphic loci in laboratory colonies of squirrel monkeys from Bolivian, Peruvian, and Guyanese stocks by VandeBerg et al. (1990; see also Moore et al., 1990) led them to recognize two species; however, they reported hybrids between these stocks. A recent review of the genus (Costello et al., 1993) concluded that all living *Saimiri* are conspecific. These authors used the words *sciureus*, *boliviensis*, and *madeirae*, among others; mapped the distributions of populations to which they applied these words; discussed differences between these populations; provided evidence for their "hybridization" or intergradation; but did not use formal subspecies names. In contrast, Groves (*in* Wilson and Reeder, 1993: 260) recognized five living species of *Saimiri*. For the time being, I accept the single species concept and choose to use the subspecies. The gray-capped *Saimiri sciureus madeirae* occurs in Brazil to the northeast of Bolivia on the right bank of the río Iténez (across from the mouth of the río Baures, at 12°29'S and 64°18'W; Thorington, 1985; specimen in the AMNH). *Saimiri madeirae* was regarded as a synonym of *S. ustus* by Groves (*in* Wilson and Reeder, 1993: 260). The type locality of *ustus* had been restricted to Humaita, also the type locality of *madeirae*, by Hershkovitz (1984: 198), but Costello et al. (1993: 182) argued that the type specimen of *ustus* could not have come from there and differs from descriptions given by Hershkovitz and by Thorington (1985). Costello et al. thus regarded *ustus* as a synonym of *sciureus* (in the restricted sense) and treated *madeirae* as a separate entity within the larger species *S. sciureus*.

Have any local populations of the Brazilian gray-capped morph, whatever the correct name may be, become established on the Bolivian side of the Iténez (or have any populations of the black-capped *S. sciureus boliviensis* become established on the Brazilian side)? Naturalists on the Iténez should seek observations or (preferably) specimens that might answer this question.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 10 and 11 are of specimens from the río Mamoré (AM 211615–211621, 211647, 211649–211653).

KARYOLOGY: The diploid number of chromosomes is 44 (Cambefort and Moro, 1978: 312, studied two males; Minezawa and Valdivia Borda, 1984b: 55, studied 61 males and 14 females). García et al. (1995: 497) studied one female and three males from Santa Cruz de la Sierra. They verified the number 44 and added further details on banding of chromosomes.

DISTRIBUTIONAL NOTES: Localities are listed below and distribution is mapped in figure 636.

HABITAT: Observed in Pando in four different vegetation types but preferred low forest and secondary growth ("Monte bajo"

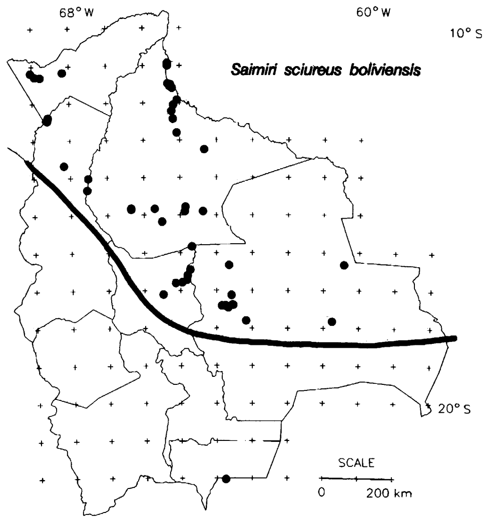


Fig. 636. Localities of known occurrence of *Saimiri sciureus boliviensis*. The record in Tarija is based on a specimen in the British Museum, not seen by me.

and "Barbecho") (Izawa and Bejarano, 1981: 5).

HABITS AND BEHAVIOR: Izawa and Bejarano (1981: 6) observed groups of from 3 to 32 individuals. Fairly common. Troops were observed near Cobija (2) and El Triunfo (10) by Heltne et al. (1976: table 3). In table 4, these authors estimated the densities per square kilometer of troops and individuals at Cobija to be 0.6 and 24.0, respectively, and at El Triunfo 2.5 and 100.0. Cameron et al. (1989: 64) estimated density of groups in Pando to average 0.2 per km^2 and individuals to average 5.3 per km^2. In 3 of 4 observations of *Saimiri boliviensis* by Cameron et al. (1989: 66), these animals were associated with *Cebus apella*. The mean group size and standard deviation for 59 groups observed at the EBB by García and Tarifa (1989: 98) was 49.4 ± 27.6.

PARASITES: Trypanosomes were found in 32 of 68 (= 47%) squirrel monkeys from the department of Santa Cruz, and 6 to 7% were indistinguishable from *Trypanosoma cruzi* (D'Alessandro et al., 1986).

FOOD: Included in the contents of two stomachs examined by Izawa and Yoneda (1981: 16) were fruit, flowers, and insects (but not ants).

REPRODUCTION: One female taken in August had one embryo.

CONSERVATION STATUS: All Bolivian *Saimiri* are regarded as "threatened" (CITES, Appendix II).

Scientific synonyms used for Bolivian specimens are:

Saimiri sciureus boliviensis
(I. Geoffroy Saint-Hilaire and de Blainville), 1834

Callithrix Boliviensis I. Geoffroy Saint-Hilaire and de Blainville, 1834: 89 (type locality not given, restricted to Sierras Guarayos by Elliot, 1913, vol. 1: 315).

Calitrix entomophagus d'Orbigny, 1835, plate 14 (colored figure of holotype); regarded by Elliot, 1913, vol. 1: 308, as a "redescription" of *C. boliviensis*.

Callithrix entomophagus: I. Geoffroy Saint-Hilaire, 1843: 13 (Guarayos).

Saimiris entomophagus: d'Orbigny, 1847: 10 (Chiquitos, Moxos, Santa Cruz de la Sierra). I. Geoffroy Saint-Hilaire, 1851: 38 (Guarayos).

Chrysothrix entomophaga: Burmeister, 1869: 448 (Santa Cruz de la Sierra). Pelzeln, 1883: 21 (río Mamoré, left bank, thus in Bolivia).

Saimiri entomophagus: Schlegel, 1876: 247 (Guarayos).

Saimiri ustus: Elliot, 1913, vol. 1: 314 ("Bolivia," no other documentation). Vieira, 1955: 388 ("Bolivia," no other documentation).

Saimiri boliviensis: Elliot, 1913, vol. 1: 315 (Sierras Guarayos). Osgood, 1916: 215 (Todos Santos). Rode, 1938: 235 (catalogue of types, Guarayos). Arce Pereira et al., 1963: 152 (name in list; Chipiriri, río Chapare). McLaren et al., 1984: 490 (río Talometa, Santa Cruz de la Sierra). Williams et al., 1986: 27 (behavior). García and Tarifa, 1989: 98 (observations at EBB). Cameron et al, 1989: 64 (observations in Pando). García and Tarifa, 1991: 9 (EBB). Grove *in* Wilson and Reeder, 1993: 260.

Saimiris entomophagus: Krieg, 1930: 775 (Buena Vista, Santa Cruz, Chiquitos).

Saimiri boliviensis boliviensis: Lönnberg, 1940b: 9 (Puerto Salinas). Vieira, 1955: 388 ("Bolivia," río Mamoré, no other documentation). Hill, 1960: 37 (cited Lönnberg). Hershkovitz, 1984: 191 (synonymy). Anderson, 1985b: 9 (name in list). Brown and Rumiz, 1986: 345 (summary). Hershkovitz, 1987b: 74 (Chiquitos, Moxos, Santa Cruz). Moore et al., 1990: 118 (lab study, used "Bolivian animals"). VandeBerg et al., 1990: 109 (genetics of lab stocks). Tarifa, 1991: 74 (name in list, summary of status). García et al., 1995: 497 (Santa Cruz de la Sierra).

Cebus sciureus boliviensis: Pusch, 1941: 215 (Santa Cruz, province of Sara, Guayaros).

Saimiri sp.: Soria, 1957b: 3 (río Surutú, MACN 17.36 and 17.37); 1959: 136 (río Surutú).

Saimiri sciureus boliviensis: Cabrera, 1958: 171. Thorington, 1985: 30. Suárez Morales, 1986: 40 (name in list). Silva et al., 1993: 184 (río Mamoré). Anderson, 1993: 28 (general distributional records). Anderson et al., 1993: 32 (vicinity of Santa Cruz de la Sierra).

Saimiri sciureus: Heltne et al., 1976: table 2 (seen at Cobija and El Triunfo; "reliable reports" at Ixiamas and Riberalta). Napier, 1976: 60–61. Bejarano, 1980: 700 (general map). Izawa and Yoneda, 1981 (observations in Pando). Izawa and Bejarano, 1981 (observations in Pando). Freese et al., 1982: 68 (seen near Riberalta and El Triunfo in the Beni, reported near Ixiamas in La Paz, and seen near Cobija in Pando). Pook and Pook, 1982: 200 (Pando). Natori, 1984: 23 (molar structure, no specific locality, stock introduced into Japan from Bolivia). Minezawa and Valdivia Borda, 1984b: 58 (near Santa Cruz). Jacobs and Blakeslee, 1984: 348 (four subjects from "Bolivia"). Iseki et al., 1985: 18 (Chivé and Nueva España in Pando and Colonia Piray in Santa Cruz). Kakoma et al., 1985: 102–107 (hematology of wild-caught Bolivian specimens of uncertain provenance). Cabot et al., 1986: 42 (name in list). D'Alessandro et al., 1986: 286 (trypanosomes in specimens from the department of Santa Cruz). Suárez Morales, 1986: 87 (EBB). Tello, 1986: 17 (observed at Piedras Blancas on the río San Pablo, at Zapoco, and at Laguna Bay). García and Braza, 1987: 338 (observed in the Beni Biological Reserve). García et al., 1987: 15 (EBB). Kohlhaas, 1988: 95 (seen in northwestern Pando). Stearman, 1990: 380 (Yuquí camp at 1647/6457). Emmons, 1991: 72 (seen at Alto río Madidi in La Paz department). Costello et al., 1993: 205 (review of species level taxonomy, but without use of subspecies names).

Saimiri sciurea boliviensis: Cambefort and Moro, 1978: 312 (near Santa Cruz de la Sierra, between 1727/6334 and 1720/6337).

Saimiri sciurus: Vargas and Mendez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area).

LOCALITIES (54) AND SPECIMENS (232): **Beni:** 1056/6520, Cachuela de Siete Islas, 1 AM; 1100/6520, 7 km S of Siete Islas, 2 AM; 1129/6519, opposite Coimbra, 1 AM; 1130/6515, left bank of río Mamoré, 2 in Vienna (Pelzeln, 1883; Thorington, 1985); 1133/6516, 10 km N of Santa Rosa, 2 AM; 1134/6513, 5 km SW of Buena Hora, 2 AM; 1136/6512, 6 km S of Buena Hora, 5 AM; 1155/6504, San Lorenzo, at mouth of río Iténez, 6 AM; 1203/6510, 5 km NW of Alejandria, 1 AM; 1213/6513, Cascajal, 1 AM; 1213/6513, opposite Cascajal, 3 AM; 1226/6511, río Mamoré, 14 AM; 1248/6505, Puerto Siles, 5 AM; 1315/6420, Piedras Blancas, 4 MNK; 1420/6733, Puerto Salinas, on río Beni, 14 Stockholm (Lönnberg, 1940b); 1447/6451, río Ibare, 27 km from mouth, 7 AM; 1447/6451, río Ibare, 26 km from mouth, 2 AM; 1449/6621, Isla de Crete, 2 km N of río Curiaba, 1 EBD; 1450/6542, 15 km W of San Ignacio de Moxos, 1 MSB; 1451/6621, Reserva Biológica del Beni, La Cabaña, 5 EBD; 1454/6422, 6 km W of Casarabe, 4 AM; 1454/6452, 17 km SE of Puerto Julio, 5 AM; 1510/6530, Mojos (d'Orbigny, 1847; Hershkovitz, 1984: 159); 1550/6441, 5 km NW of mouth of río Grande, 4 AM. **Cochabamba:** 1643/6449, río Chimoré, 14 CBF; 1647/6457, Campamento Yuqui, 6 MNLP; 1648/6508, Todos Santos, 13 AM, 1 FM, 3 ANSP; 1706/6529, Palmar, Yungas, 1 ANSP; coordinates uncertain, río Chipiri, 2 (Thorington, 1985). **La Paz:** 1340/6810, 35 km N of Ixiamas (Freese et al., 1982; Hershkovitz, 1984: 205); 1401/6731, río Beni, 1 CBF. **Pando:** 1110/6810, Cobija (Freese et al., 1982; Hershkovitz, 1984: 159); 1111/6902, Mucden, 1 FM; 1117/6855, río Nareuda, 1 AM; 1118/6846, río Nareuda area, 1 (in possession of G. Bejarano, in La Paz); 1223/6835, Chivé, 2 (Iseki et al., 1985); 1228/6836, Nueva España, 2 (Iseki et al., 1985). **Santa Cruz:** 1619/6026, Guarayos, río San Miguel (Hershkovitz, 1984: 159); 1620/6339, Colonia Piray, 1 (Iseki et al., 1985); 1627/6444, río Ichilo, right bank, 51 km S of mouth of río Chapare, 2 AM; 1636/6448, río Ichilo, 70 km S of mouth of río Chapare, 7 AM; 1707/6335, province of Sara, 4 BM (not seen); 1707/6335, vicinity of Santa Rosa, 1 Hayward coll.; 1722/6333, río Talometa, 1 CM; 1723/6332, San Miguel Rincón, 1 AM; 1724/6344, 7 km N and 17 km W of Buenavista, 1 AM; 1724/6346, río Yapacaní, 1 BM (Napier, 1976), 4 CM, 4 FM; 1724/6351, río Surutú, 4 MACN (not seen); 1727/6340, Buenavista, 4 AM, 3 ANSP, 8 BM (not seen), 2 FM, 1 MACN (not seen); 1748/6310, Santa Cruz de la Sierra, 1 BM, 7 CM, 5 EBD; 1749/6045, San José de

Chiquitos (d'Orbigny, 1847; Hershkovitz, 1984: 159); coordinates uncertain, N. Moka, 1 MACN (not seen); coordinates uncertain, province of Guarayas, 2 (d'Orbigny, 1847; Thorington, 1985); coordinates uncertain, Matas arredores, 1 (Thorington, 1985). **Tarija:** 2202/6345, Yacuiba, 1 BM (not seen). **Department unknown:** "Bolivia" only, 1 ANSP, 2 BM (not seen), 2 AM, 5 MACN (not seen); Bolivia, perhaps, 1 BM (not seen); 9 MNLP.

SUBFAMILY PITHECIINAE MIVART, 1865

This subfamily was recognized by Groves (*in* Wilson and Reeder, 1993: 260) for *Cacajao*, *Chiropotes*, and *Pithecia*. Only the latter genus occurs in Bolivia.

Genus *Pithecia* Desmarest, 1804

Pithecia irrorata irrorata Gray, 1842

Saki Monkey

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Pithecia irrorata* was described by Gray (1842: 256); type locality "Tropical America," restricted to "west (left) bank Rio Tapajos, Parque Nacional de Amazonia, Para, Brazil," by Hershkovitz (1987a: 426). *Pithecia monachus* was described by É. Geoffroy Saint-Hilaire (*in* Humboldt, 1812: 359); type locality "Probablement le Bresil" restricted by Tate (1939: 221) to the Tapajos River." *Pithecia hirsuta* was described by Spix (1823: 14), type locality "sylvis fluminis Solimoens et Negro interjacentibus."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 10 and 11 are of a specimen from the río Nareuda (AM 248723).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 637.

HABITAT: High forest (Monte alto).

HABITS AND BEHAVIOR: The home range of a group was estimated as 25 to 40 hectares by Izawa and Yoneda (1981: 19). Groups of from one to four (average 1.9) were seen (in 51 cases). Three troops were observed near Cobija by Heltne et al. (1976: table 3). In table 4, these authors estimated the densities of troops and individuals per square kilometer to be 1.1 and 6.6, respectively. In 1986 near Cobija, Kohlhaas (1988) estimated density of groups to average 0.53 per km^2 or 1.18 individuals per km^2, with the mean group size 2.22 (range 1–4). Cameron et al. (1989: 64) estimated density of groups in Pando to average 1.0 per km^2 and individuals to average 2.9 per km^2. In 3 of 17 observations of *Pithecia irrorata* by Cameron et al. (1989: 66) these animals were associated with *Saguinus fuscicollis* and *S. labiatus*.

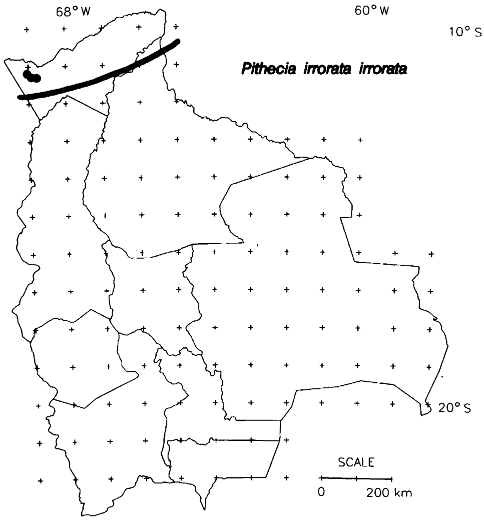


Fig. 637. Localities of known occurrence of *Pithecia irrorata irrorata*.

FOOD: Izawa and Yoneda (1981: 16) examined the stomach contents of two in Pando and found fruit, flowers, leaves, ants, and other insects. This suggests a fairly omnivorous diet.

REPRODUCTION: No data.

CONSERVATION STATUS: Regarded as threatened (CITES, Appendix II).

Scientific synonyms used for Bolivian specimens are:

Pithecia monachus: Heltne et al., 1976: table 2 (seen near Cobija in Pando). Freese et al., 1982: 68 (seen near Cobija). Pook and Pook, 1982: 199 (Pando). Tello, 1986: 17 (pets seen at Laguna Bay). Emmons and Feer, 1990: 120 (mentioned Bolivia).

Pithecia hirsuta: Hershkovitz, 1979a: 2 (map, cited Pelzeln, 1883, for two records in Rondonia, in Brazil across the río Mamoré from Bolivia).

Izawa and Bejarano, 1981: 3 (seen on north bank of río Tihuamanu). Izawa and Yoneda, 1981: 16 (Mukden). Anderson, 1985b: 9 (name in list). Brown and Rumiz, 1986: 349 (summary). Buchanan-Smith, 1990: 205 (observed near 1111/6842). Tarifa, 1991: 73 (name in list, summary of status).

Pithecia irrorata irrorata: Hershkovitz, 1987a: 426 (Mukden, Cobija, Tahuamanu). Anderson, 1993: 27 (general distributional records).

Pithecia irrorata: Kohlhaas, 1988: 95 (seen in northwestern Pando). Cameron et al, 1989: 64 (observations in Pando).

LOCALITIES (3) AND SPECIMENS (3): **Pando:** 1111/6902, Mucden, 1 FM; 1117/6855, río Nareuda, 1 AM; 1118/6846, río Nareuda area, 1 La Paz.

FAMILY HOMINIDAE GRAY, 1825

Genus *Homo* Linnaeus, 1758

Homo sapiens Linnaeus, 1758

Human beings probably reached South America and Bolivia more than 10,000 years ago, but there is considerable uncertainty as to exactly when. The human population had profound effects on native mammals both before and after European colonization about 500 years ago. The biology, anthropology, and other scientific fields concerned with humans are beyond the scope of this work. Human skeletal materials exist in archeological collections but I have not examined or documented these.

ORDER CARNIVORA BOWDICH, 1821

TAXONOMIC NOTES: Four Bolivian specimens from the Bridges collection were referred to as *Vulpes azarae* by Gerrard (1862: 87), I assume they are canids but beyond that I don't know.

Measurements given of Carnivora in tables 12 and 13 are as follows: total length, length of tail vertebrae, length of hind foot, length of ear from notch, weight in grams, condylobasal length, palatal length (from anterior edge of mesopterygoid fossa to anterior point of premaxillary), interdental breadth (least width between lingual alveolar margins of upper cheekteeth), length of P4, (greatest) transdental breadth at P4, postdental breadth (at constriction of palatine bones), rostral breadth (at canines), interorbital breadth (at constriction anterior to supraorbital process), postorbital breadth (at constriction behind supraorbital process), zygomatic breadth, squamosal breadth (at constriction behind zygomatic arch), breadth of braincase (between points on most vertical part of each lateral wall), temporal breadth at frontal margin (between temporal ridges).

Families and taxa of lower categories are arranged alphabetically, not phylogenetically.

FAMILY CANIDAE FISCHER, 1817

PARASITOLOGY: The flea *Ctenocephalides felis felis* was reported from "*Canis* sp." from Santa Cruz de la Sierra by Hopkins and Rothschild (1953: 154).

Genus *Atelocynus* Cabrera, 1940

A single species of this genus is known.

Atelocynus microtis
(Sclater), 1883

Short-eared Fox,
Zorro de Orejas Cortas

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Canis microtis* was described by Sclater (1883: 631); type locality "Amazons" restricted to "south bank of the Rio Amazonas, Pará, Brazil" by Hershkovitz (1958a: 160). Cabrera (1940: 14) first used the name *Atelocynus microtis*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 12 and 13 are of a specimen from Buenavista (BM 26.1.5.5).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 638. Langguth (1980: 589) noted Bolivian specimens in two European museums.

No Bolivian data are available on habitat, habits, behavior, food, reproduction, or conservation status.

Scientific synonyms used for Bolivian specimens are:

Atelocynus microtis: Anderson, 1985b: 10 (undocumented name in list). Berta, 1986 (general summary). Emmons, 1991: 72 (seen at Alto río Madidi in La Paz department). Anderson et al., 1993: 36 (vicinity of Santa Cruz de la Sierra).

Dusicyon microtis: Cabot et al., 1986: 43 (undocumented name in list for Beni). Ginsberg and

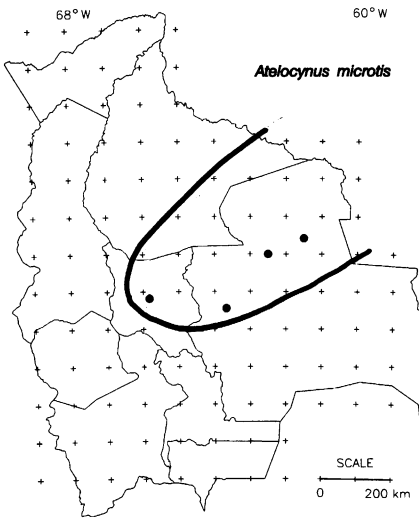


Fig. 638. Localities of known occurrence of *Atelocynus microtis*.

Macdonald, 1990: 30 (summary of distribution and conservation status, no new Bolivian data).

Atelocynus microtus: Anderson, 1993: 30 (misspelling, general distributional records).

LOCALITIES (4) AND SPECIMENS (4): **Cochabamba:** 1711/6549, province of Chapare, 1 ZSM. **Santa Cruz:** 1535/6130, 70 km N of Santa Rosa de la Roca, 1 MNK; 1600/6230, Totaitu, 1 MNK (skin only); 1727/6340, Buenavista, 1 BM.

Genus *Canis* Linnaeus, 1758

Canis familiaris Linnaeus, 1758

Dog or Perro

Stray dogs are frequently seen in rural and urban areas. In cities, control efforts are needed because of the risk of rabies. I have never seen a pack of feral dogs in Bolivia; such groups probably do occur.

Scientific synonyms used for Bolivian specimens are:

Canis familiaris Linnaeus, 1758: 38 (domestic dog). Neveu-Lemaire and Grandidier, 1911: 109. Cabrera, 1932b (on Amerindian dogs in Argentina). Mercado Tudor and Miralles Goytia, 1991: 295 (La Paz Valley).

Canis lupus: Wozencraft *in* Wilson and Reeder, 1993: 281 (placed *familiaris* in the synonymy of *lupus*). Both were described by Linnaeus (1758). See comments on names used for domesticated mammals in the account of *Felis catus*.

LOCALITIES (12) AND SPECIMENS (15): **Beni:** 1513/6440, near Loreto, 1 AM. **Chuquisaca:** 1904/6449, 12 km N and 11 km E of Tarabuco, 1 MNK; 1910/6453, 2 km N and 3 km E of Tarabuco, 2 MNK; 2045/6313, Porvenir, 1 AM. **La Paz:** 1456/6918, 12 km N and 3 km W of Ulla Ulla, 1 AM (dentary only); 1633/6805, Cota Cota, 1 MNLP. **Santa Cruz:** 1647/6314, Estancia Cachuela Esperanza, 1 AM; 1727/6340, Buenavista, 1 CM (fetus in alcohol); 1735/6315, 4 km SW of La Belgica, 1 MSB; 1805/6250, Brecha 5.5, ca. 55 km SE of Santa Cruz, 1 MSB. **Tarija:** 2129/6457, 1 km E of Iscayachi, río Tomayapo, 1 AM; 2138/6234, Estancia Bolívar, 1 CBF. **Department unknown:** "Bolivia" perhaps, 2 MNLP.

Canidae, genus and species not determined

LOCALITIES (4) AND SPECIMENS (6): **Beni:** 1630/6140, Zapoco, 2 MNK. **Chuquisaca:** 2058/6251, 30 km SE of Carandaiti, 1 LACM (not seen). **Santa Cruz:** 1615/6204, Esperanza, near Concepción, 1 BM (not seen); 1748/6310, Santa Cruz de la Sierra, 1 BM (pup). **Department uncertain:** perhaps Beni, 1 MNK.

Genus *Cerdocyon* Hamilton Smith, 1839

Cerdocyon thous (Linnaeus, 1766)

Forest Fox, Zorro de Monte

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Canis thous* was described by Linnaeus (1766: 60), type locality "Surinamo." *Canis Entrerianus* was described by Burmeister (1861: 400), type locality "Entrerios," Paraña, province of Entre Ríos, Argentina. Eisentraut (1933: 55) reported a few observations of a fox, perhaps from near Villa Montes in Tarija, under the name *Pseudalopex azarae*. In a footnote he noted the presence of a second species of fox, more golden in color, from near Samuhuate and suggested that this might be *Lycalopex thous*. I suspect that the "*Pseudalopex azarae*" were *Cerdocyon thous* and that

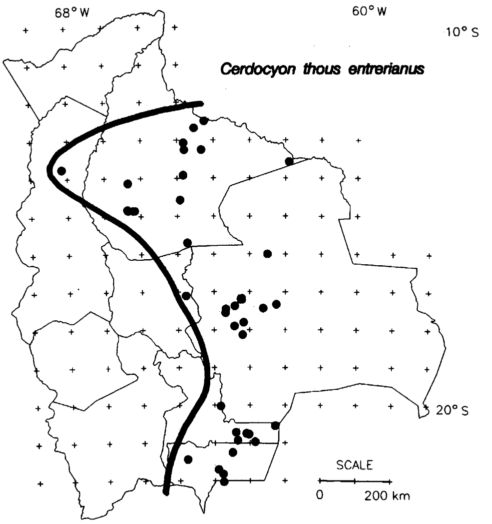


Fig. 639. Localities of known occurrence of *Cerdocyon thous entrerianus*.

the second species was *Pseudalopex gymnocercus*. Wozencraft (*in* Wilson and Reeder, 1993: 284) placed *entrerianus* in the synonymy of *Pseudalopex gymnocercus* rather than *Cerdocyon thous*. An explanation is needed of why this change was made.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 12 and 13 are of specimens from Caraparí (BM 25.2.1.10 to 17) and Remanso (AM 209122–209124).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 639.

HABITAT: "Savanna, llanos, and woodland" (Ginsberg and Macdonald, 1990: 25). This general statement also applies to Bolivia.

HABITS AND BEHAVIOR: Are generally crepuscular or nocturnal, but occasionally seen in the day.

PARASITOLOGY: Fonseca (1960: 93) reported a tick (*Amblyomma tigrinum*, Ixodidae, from *Cerdocyon thous* from Ipati, 2033/6326).

FOOD: No Bolivian data. Elsewhere reported to be omnivorous (Berta, 1982: 2).

REPRODUCTION: No useful data for Bolivia. Elsewhere reported to live in monogamous pairs or small groups, to mate in November or December, to have 52–59 days of gestation, to have litters of 3 to 6, and to mature in less than a year (Ginsberg and Macdonald, 1990: 25).

CONSERVATION STATUS: Not listed under IUCN or CITES (Ginsberg and Macdonald, 1990: 97).

Scientific synonyms used for Bolivian specimens are:

Cerdocyon thous entrerianus
Burmeister, 1861

Canis cancrivorus: Burmeister, 1869: 453 (Santa Cruz de la Sierra).

Cerdocyon mimax: Thomas, 1925: 576 (Caraparí, Yucuiba, Sierra Santa Rosa).

Canis thous: Pilleri, 1977b: 48 (name in list). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area).

Cerdocyon thous entrerianus: Berta, 1982: 1 (general summary on species). Anderson, 1993: 30 (general distributional records for Bolivia). Anderson et al., 1993: 36 (vicinity of Santa Cruz de la Sierra).

Cerdocyon thous: Fonseca, 1960: 93 (ectoparasites, Ipati). Nowak and Paradiso, 1983: 944 (Bolivia); Berta, 1987: 458 (phylogeny). Ginsberg and Macdonald, 1990: 25 (brief summary of biology of the species, especially distribution and conservation status, no new Bolivian data). Parker et al., 1993: 101 (seen at Curuyuqui).

Dusicyon thous: Cabot et al., 1986: 43 (undocumented name in list).

Dusicyon spp: Tello, 1986: 24 (probably his notes on status mostly relate to *C. thous*).

LOCALITIES (40) AND SPECIMENS (116): **Beni:** 1230/6415, Pampa de Meio, 2 AM; 1241/6432, 15 km above Horquilla on río Machupo, 3 AM; 1304/6449, San Joaquín, 1 AM, 1 FM; 1315/6420, Piedras Blancas, 1 MNK; 1315/6448, 20 km S of San Joaquín, 2 AM; 1334/6154, Remanso, 3 AM; 1355/6450, Las Cusi, 1 MNK; 1408/6621, Espíritu, 1 IE; 1434/6455, río Mamoré, about 23 km W of San Javier, 6 AM; 1450/6621, Estancia la Cabaña (or Tabana), 40 km de San Borja, 1 CBF; 1451/6610, 65 km E of San Borja on road to Trinidad, 1 EBD; 1451/6612, 65 km E of San Borja on road, 1 EBD; 1451/6621, Estancia Porvenir, 1 EBD, 1 MNLP; 1451/6621, Totaisal, 1 EBD; 1542/6444, río Mamoré, 2 km N of Jerusaleum, 1 AM. **Chuquisaca:** 2001/6350, Ibopeite, 1 Frankfurt (H. Felton, in litt.); 2033/6217, Bolivian border near Sargento Rodriguez [Paraguay], 1 Univ. of Connecticut; 2043/6324, 10 km N of Macharetí, 1 AM; 2045/6306, 4.5 km by road W of Carandayti, 2 AM; 2046/6302, 6 km by road E of Carandayti, 1 AM; 2056/6321, 2 km S and 10 km E of Tiquipa, at Laguna Palmar, 2 AM; 2058/6251, 30 km SE of Carandaita, 1 LACM. **Cochabamba:** 1706/6447, Sajta, 1 CBF. **La Paz:** 1345/6809, Ixiamas, 1 US. **Santa Cruz:** 1600/6230, Totaitu, 1 MNK; 1708/6313, 5 km S of Mineros, 1 MSB; 1720/6215, Hacienda San Miguelito, 40 km SE of Río San Julian de Palca del Tuna, 2 MNK; 1722/6325, province of Sara, 1 CM; 1726/6237, 30 km N of Estación Pailón, 1 MSB; 1727/6340, Buenavista, 2 AM, 17 BM, 2 CM, 8 MACN, 2 FM (not all seen), 9 MACN (not seen); 1733/6341, 5 km N and 8 km W of San Rafael de Amboró, río Surutú, 1 AM; 1748/6310, Santa Cruz de la Sierra, 1 CM, 1 MN (A. Langguth, in litt., 2 MACN (not seen); 1754/6326, 15 km SW of Santa Cruz, 1 US; 1808/6312, 7 km E and 3 km N of Ingeniero Mora, 1 AM. **Tarija:** 2115/6330, Villa Montes, 1 ZSM and 1 ZMB (A. Langguth, in litt.); 2126/6447, San Lorenzo, 1 ANSP; 2142/6354, Sierra Santa Rosa, Itau, 1 BM; 2149/6346, Caraparí, 11 BM; 2202/6345, Yacuiba, 3 BM. **Department unknown:** perhaps Beni, 2 MNK; Bolivia, 1 EBD, 2 MACN (not seen); perhaps Bolivia, 2 MNLP.

Genus *Chrysocyon* Hamilton Smith, 1839

The single species of the genus occurs in Bolivia.

Chrysocyon brachyurus (Illiger), 1815

Maned Wolf, Lobo Crinado, Lobo Guará, and Borochi

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Canis brachyurus* was described by Illiger (1815: 109); type locality given by Cabrera (1958: 241) as "los esteros del Paraguay," or marshlands of Paraguay. Osgood (1919: 35) first used the name combination *Chrysocyon brachyurus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 12 and 13 are of specimens from Goyaz state in Brazil (AM 133940) and 17 km N of San Joaquín (AM 96003).

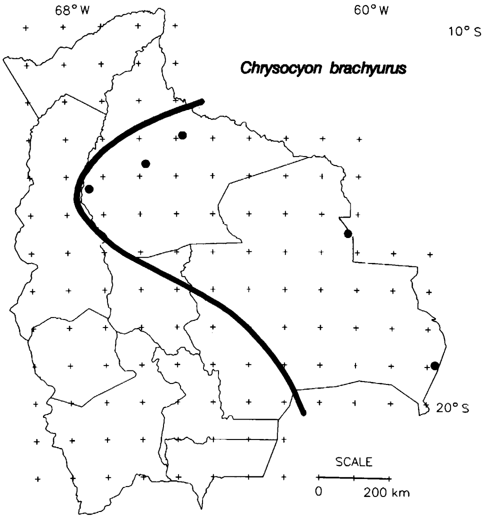


Fig. 640. Localities of known occurrence of *Chrysocyon brachyurus*.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 640.

HABITAT: "Grassland and scrubland, also in agricultural areas. Found in a great variety of habitats, all open. Not found at high altitudes or in rain forests" (Ginsberg and Macdonald, 1990: 24). The few Bolivian data fit this general description.

HABITS AND BEHAVIOR: No Bolivian data.

FOOD: No Bolivian data. Elsewhere, in one field study "diet consisted largely of fruits and small mammals, and changed with seasonal availability of foods" (Dietz, 1985: 2).

REPRODUCTION: No Bolivian data. Elsewhere, said to mate in months from December to June, with a peak in May or June, to have 62 to 66 days of gestation, to have one to five in a litter, with a mean of two, and to breed in the second year (Ginsberg and Macdonald, 1990: 24).

CONSERVATION STATUS: Regarded as threatened (CITES, Appendix II).

Scientific synonyms used for Bolivian specimens are:

Chrysocyon brachyurus: Cabot et al., 1986: 43 (undocumented name in list). Tello, 1986: 23 (observed at Los Palmares, reports from Zapoco, San Ignacio, Los Totumos, Cofadena, Laguna San Luis, San Pablo, and San Pedro). Ginsberg and Macdonald, 1990: 25 (brief summary of biology of the species, especially distribution and conservation status; no new Bolivian data). Ergueta and Salazar, 1991: 24 (general summary). Anderson, 1993: 30 (general distributional records).

Crysocyon brachyurus: Pilleri, 1977b: 48 (name in list).

Chrysocion brachyurus: Suárez Morales, 1986: 123 (undocumented name in list).

LOCALITIES (5) AND SPECIMENS (4): **Beni:** 1255/6449, Caravana, 17 km N of San Joaquín, 1 FM; 1340/6550, Bella Vista, photos; 1419/6723, Reyes, 1 ZSM (A. Langguth, in litt.); **Santa Cruz:** 1530/6016, Curichi Grande near Brazilian border, 1 US; 1857/5747, Bolivian border to the west of Caceres, 1 US.

Genus *Pseudalopex*
Burmeister, 1856

Both Bolivian species of *Pseudalopex* are listed as "threatened" under CITES Appendix II. Another species, *Pseudalopex grisea*, occurs in Jujuy and Salta, provinces of Argentina just south of Bolivia, and may be discovered eventually in Bolivia. Foxes referred to as *Dusicyon* sp. were seen at Curuyuqui and Perforación (Parker et al., 1993: 101). These may have been *Pseudalopex gymnocercus* but identification is uncertain.

Pseudalopex culpaeus
(Molina), 1782

Andean Fox, Atoj (Quechua),
Khamake (Aymara), Culpeo,
Zorro Andino, and Zorro Colorado

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Canis Culpaeus* was described by Molina (1782: 293); type locality Chile, restricted by Cabrera (1931: 62) to "Santiago province." *Pseudalopex* is a feminine noun and at one time Thomas (1921d: 385) used *P. culpea*, but as pointed out by Cabrera (loc. cit.), *culpaeus* is not an adjective but is a noun in apposition from the araucanian name "culpeo" and thus can retain its original masculine ending.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Thomas (1914c: 357) commented on geographic variation within the large range of the culpeo. In the south, skulls are longer, especially in the muzzle, and in the north they are shorter. Specimens from Ecuador, Peru, and Bolivia were said to agree in the size and shape of their skulls, but those from Peru and Bolivia are "more suffused with buffy above, especially anteriorly, and white below." These were named as *Pseudalopex culpaeus andina*. Some measurements of the holotype (an adult male) were hind foot, 148 mm; greatest length of skull, 165; condylobasal length, 156; zygomatic breadth, 88; nasals along midline, 54; interorbital breadth, 31; breadth of braincase, 50; palatal length, 84; length of P4 on outer edge, 16; combined length of M1–M2, 16.8. Measurements in tables 12 and 13 are of specimens from Cumbre (AM 73099), 8 km N of Oruro (AM 244656), Estancia Agua Rica (AM 262663), and Lipez (BM 26.6.12.1).

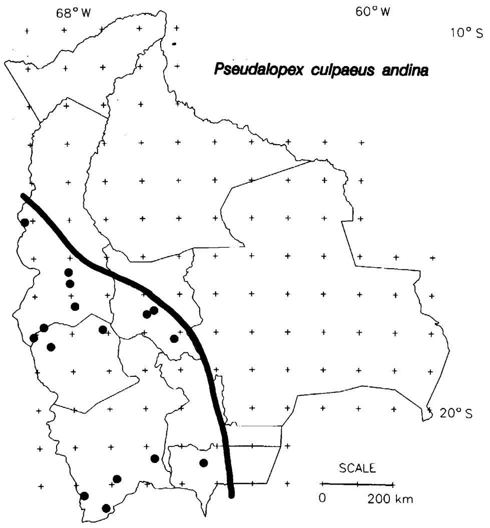


Fig. 641. Localities of known occurrence of *Pseudalopex culpaeus andina*.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 641.

HABITAT: At elevations above 2100 m in Bolivia. Vegetation is scant in this region. These zorros occupy agricultural areas as well as areas largely uninhabited by people.

HABITS AND BEHAVIOR: No Bolivian data.

FOOD: The stomach contents of one specimen included *Calomys lepidus* and *Phyllotis* *xanthopygus*, both common rodents on the altiplano.

REPRODUCTION: No Bolivian data.

CONSERVATION STATUS: Listed as threatened (CITES, Appendix II; Ginsberg and Macdonald, 1990: 97). Insufficient data for Bolivia are available to estimate population density or to measure changes therein.

Scientific synonyms used for Bolivian specimens are:

Pseudalopex culpaeus andina Thomas, 1914

Pseudalopex magellanicus: Gray, 1869a: 512 ("Bolivia"); 1869b: 200 ("Bolivia").

Canis azarae: Thomas, 1898a: 278.

Pseudalopex culpaeus andina Thomas, 1914: 357 (type locality "Esperanza, near Mt. Sajama, Province of Oruro, Bolivia. Alt. 4000 m." but actually in the department of La Paz rather than Oruro); 1926b: 319 (Tambo); 1926d: 194 (Lipez). Cabrera, 1931: 63.

Pseudalopex culpaeus andinus: Cabrera, 1932a: 498 (mentioned Bolivia). Donoso et al., 1992: 21 (La Cumbre). Anderson, 1993: 30 (general distributional records). Yensen and Tarifa, 1993: 53 (1805/6904, río Junthuma Kuchu).

Dusicyon culpaeus: Jungius, 1974: 379 (reported in department of La Paz, no specimens). Ginsberg and Macdonald, 1990: 26 (brief summary of biology of the species, especially distribution and conservation status, no new Bolivian data).

Pseudalopex culpaeus: Nowak and Paradiso, 1983: 943 (Andes region). Berta, 1987: 458 (phylogeny).

Canis (Dusicon) culpaeus andinus: Suárez Morales, 1986: 55 (undocumented name in list and misspelling of *Dusicyon*).

Culpaeus andinus: Suárez Morales, 1986: 114 (undocumented name in list and erroneous generic name).

Canis culpaeus: Salazar, 1990: 187 (Reserva "Eduardo Abaroa" at Laguna Colorada). Ibáñez 1982: 60 (Laguna Colorada).

Canis culpaeus andinus: Mercado Tudor and Miralles Goytia, 1991: 295 (La Paz Valley).

LOCALITIES (16) AND SPECIMENS (23): **Cochabamba:** 1725/6543, Tiraque, 1 ANSP; 1731/6555, Cerro San Benito, 1 MACN (not seen); 1810/6510, Aiquile, 1 MACN (not seen). **La Paz:** 1502/6913, Ulla Ulla, orilla [= bank of] río Suches, 1 EBD; 1622/6803, La Cumbre, 1 AM; 1640/6801, Mecapaca, 1 EBD; 1717/6754, Patacamaya, 1 CBF; 1749/6847, Esperanza, 4 BM. **Oruro:** 1754/6709, 8 km N of Oruro, 1 AM; 1805/6904, 5 km N and 8 km W of Sajama, 1 CBF (Yensen and Tarifa, 1993: 53); 1820/6836, Estancia Agua Rica, 40 km E and 22 km S of Sajama, 1 AM. **Potosí:** 2119/6546, Finca Salo, near Oploca, 1 ANSP; 2151/6651, Lipez, 1 BM; 2217/6747, Laguna Colorado, 2 EBD; 2237/6710, Laguna Kalina, 2 EBD; **Tarija:** 2127/6423, Tambo, 1 BM. **Department unknown:** "Bolivia," 2 MNLP.

Pseudalopex gymnocercus (Fischer, 1814)

Pampa Fox, Zorro Pampa

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Procyon gymnocercus* was described by Fischer (1814: 178); type locality "Paraguay," restricted by Cabrera (1958: 235) to "los alrededores de Asuncion" or the vicinity of Asunción. See remarks under *Pseudalopex culpaeus* in regard to the gender of generic names and endings of the specific epithets. *Procyon* is masculine and *Pseudalopex* is feminine. If *gymnocercus* (meaning "naked-tail") can be regarded as a noun in apposition rather than an adjective then the original spelling of *gymnocercus* may be retained under the Code.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 12 and 13 are of specimens from the río Yapacaní (FM 51869) and Laguna Palmar (AM 246964–246968, 246970–246971).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 642. The assumption that the "La Paz" record is from the city of La Paz may be questioned on the basis of the generally lower elevation of other Bolivian records. However, the record from near Colomi is at 3125 m elevation, which is about the same elevation as the lower part of the city of La Paz.

HABITAT: "Pampas, hills, and deserts" (Ginsberg and Macdonald, 1990: 29). The limited Bolivian data agree with this general statement.

No Bolivian data are available on habits, behavior, food, or reproduction.

CONSERVATION STATUS: Listed as Threatened (CITES, Appendix II).

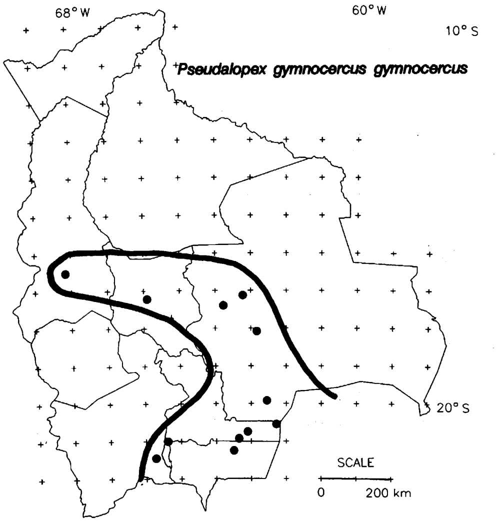


Fig. 642. Localities of known occurrence of *Pseudalopex gymnocercus gymnocercus*.

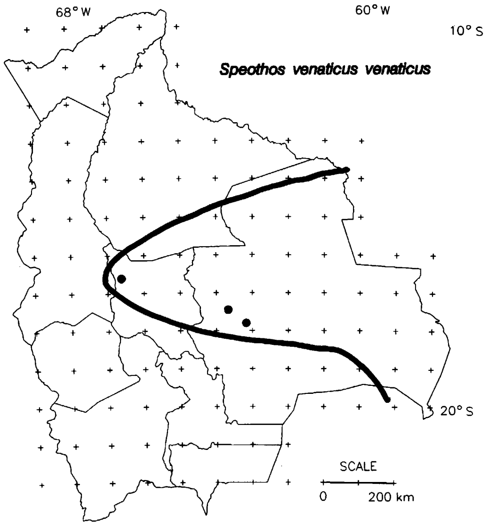


Fig. 643. Localities of known occurrence of *Speothos venaticus venaticus*.

Scientific synonyms used for Bolivian specimens are:

Pseudalopex gymnocercus gymnocercus (Fischer), 1814

Pseudalopex gymnocercus: Nowak and Paradiso, 1983: 943 (use of name). Berta, 1987: 458 (phylogeny).

Dusicyon gymnocercus: Hershkovitz, 1987b: 74 (Chiquitos). Ginsberg and Macdonald, 1990: 29 (brief summary of biology of the species, especially distribution and conservation status, no new Bolivian data).

Pseudalopex gymnocercus gymnocercus: Anderson, 1993: 30 (general distributional records).

LOCALITIES (12) AND SPECIMENS (43): **Chuquisaca:** 2033/6217, Bolivian border near Sargento Rodriguez, Paraguay, 9 Univ. Connecticut (some from Bolivian side of border); 2045/6306, 4.5 km by road W of Carandayti, 1 MSB; 2056/6321, 2 km S and 10 km E of Tiquipa, at Laguna Palmar, 7 AM; 2100/6523, El Colorado, near Villa Abecia, 1 EBD. **Cochabamba:** 1713/6554, 13 km N of Colomi, 1 MSB. **La Paz:** 1630/6809, La Paz (assumed to be the city), 2 MACN (1 not seen). **Potosí:** 2127/6543, Tupiza, 1 MACN (not seen). **Santa Cruz:** 1708/6313, 5 km S of Mineros, 1 Hayward coll., (not seen); 1724/6346, río Yapacaní, 1 FM; 1805/6250, Brecha 5.5, ca. 55 km SE of Santa Cruz, 1 MSB; 1955/6233, Perforación, 50 km S of Cerro Colorado, 1 EBD. **Tarija:** 2115/6330, Villa Montes, 16 ZSM (A. Langguth, in litt.). **Department unknown:** "Bolivia," 1 MACN (not seen).

Genus *Speothos* Lund, 1839

The description of the genus, three years before the description of the living species, was based on a fossil species. One living species of the genus is known.

Speothos venaticus (Lund), 1842

Bush Dog, Zorro Vinagre

TAXONOMIC REMARKS: One of the most distinctive genera of canids. The name used for Bolivian specimens has its type locality outside of Bolivia. *Cynogale venatica* was described by Lund (1842: 67), type locality "Lagoa Santa," state of Minas Gerais, Brazil. Thomas (1902a: 126) used the name *Speothos venaticus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 12 and 13 are of specimens from Iquitos in Peru (AM 98559), from Charuplaya (BM 02.1.1.8 and 10), and from Santa Cruz de la Sierra (MACN 50.67).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 643.

HABITAT: The three known localities in Bolivia are below 1500 m in elevation.

HABITS AND BEHAVIOR: No Bolivian data. Elsewhere, said to be "the most social of the small canids, living in groups of up to 10 individuals" (Ginsberg and Macdonald, 1990: 31). "Den in burrows or hollow tree trunks. Mainly diurnal, they spend the night in the den" (loc. cit.).

PARASITOLOGY: A flea, *Rhopalopsyllus australis tupinus*, was reported from Rio Blanco (Smit, 1987: 215; the coordinates, department, and date cited are incorrect).

FOOD: No Bolivian data. Elsewhere, said to prefer larger rodents such as *Agouti* and *Dasyprocta*, and by hunting in packs may take prey considerably larger than themselves (Ginsberg and Macdonald, 1990: 31).

REPRODUCTION: No Bolivian data.

CONSERVATION STATUS: Considered to be an endangered species (CITES, Appendix I), but so poorly known throughout its range that even this status is dubious. The limited number of specimens and observations in Bolivia attest to its relative rarity.

Scientific synonyms used for Bolivian specimens are:

Speothos venaticus venaticus (Lund), 1842

Speothos venaticus: Thomas, 1902a: 126 (río Blanco, Charuplaya). Neveu-Lemaire and Grandidier, 1911: 8 (Charuplaya). Vieira, 1955: 446 ("Bolivia"). Langguth, 1980: 589 (two in Museo Argentino de Ciencias Naturales). Cabot et al., 1986: 43 (undocumented name in list). Tello, 1986: 24 (observed at Zapoco and Los Totumus). Smit, 1987: 215 (a flea from río Blanco, near Charuplaya). Emmons and Feer, 1990: 136 (mentioned Bolivia). Ginsberg and Macdonald, 1990: 31 (brief summary of natural history of the species, especially distribution and conservation status, no new Bolivian data). Anderson, 1993: 31 (general distributional records).

Speothos venaticus venaticus: Anderson et al., 1993: 36 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (3) AND SPECIMENS (8): **Cochabamba:** 1636/6637, Charuplaya, 3 BM. **Santa Cruz:** 1727/6340, Buenavista, 1 AM; 1748/6310, Santa Cruz de la Sierra, 2 MACN. **Department uncertain:** perhaps Bolivia, 2 MNLP.

FAMILY FELIDAE FISCHER, 1817

SUBFAMILY FELINAE FISCHER, 1817

All living American felids are of this subfamily. In some groups, including the felids, there has been a pendulumlike swing historically in taxonomic style between splitting and lumping. Currently, taxonomists seem to be in a splitting phase again. For example, several groups recognized here as subgenera are used as genera by some recent authors (García-Perea, 1994; Wozencraft *in* Wilson and Reeder, 1993: 288–299).

Genus *Felis* Linnaeus, 1758

Subgenus (*Felis*) Linnaeus, 1758

Felis catus Linnaeus, 1758

House Cat, Gato Domestico

TAXONOMIC REMARKS: *Felis catus* was listed as a synonym of *Felis sylvestris* Schreber, 1775, by Wozencraft (*in* Wilson and Reeder, 1993: 290). *Felis sylvestris* is an Old World wild cat, from which domestic cats are thought to have been derived. In any case, *catus* is the prior name. The Code (ICZN, 1985) provides no basis for rejecting names proposed for domesticated species, although Wozencraft and other authors (e.g., Corbet and Hill, 1980) have done so.

On two occasions I trapped house cats away from dwellings. Perhaps these were feral individuals.

Scientific synonyms used for Bolivian specimens are:

Felis catus Linnaeus, 1758: 42. Mercado Tudor and Miralles Goytia, 1991: 295 (La Paz valley).

Felis domestica: Neveu-Lemaire and Grandidier, 1911: 10 (discussed domestic cats in Bolivia).

Felis cattus: Miralles G. and Salazar B., "1990": 7 (misspelling of name in list).

LOCALITIES (2) AND SPECIMENS (2): **Beni:** 1244/6318, Versalles, 1 AM (part of skull only). **Oruro:** 1820/6836, Estancia Agua Rica, 40 km E and 22 km S of Sajama, 1 AM.

Measurements in tables 12 and 13 are of a specimen from Brazil (AM 96295).

Subgenus (*Herpailurus*) Severtzov, 1858

Taxonomic Remarks: Wozencraft (*in* Wilson and Reeder, 1993: 291) recognized the genus *Herpailurus* Severtzov, 1858, for *H. yaguarondi*. *Herpailurus* originally included *Felis yaguarundi* Desmarest and *Felis eyra* Desmarest, which are now considered conspecific.

Felis yaguarondi Lacépède *in* Azara, 1809

Jaguarundi, Gato Eira, Moro, Gato Gris

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Felis eyra* was described by Fischer (1814: 228), type locality Paraguay. The name *yagouaroundi* of É. Geoffroy Saint-Hilaire, 1803, has been generally used, but this work was not actually published. The next available name is *yaguarondi* of Lacépède, 1809. Other variant spellings of the specific epithet are in the synonymy below.

Morphological Characters and Comparisons: Measurements in tables 12 and 13 are of specimens from Estancia Yutiole (AM 215137, 214741) and Buenavista (BM 34.9.2.32 and 33, 26.1.5.2 and 3, 26.1.12.6 to 8, ANSP 14254, FM 51861).

Distributional Notes: Known localities are listed below and mapped in figure 644.

Habitat: The highest known Bolivian locality is Cajuata at 1817 m elevation.

No Bolivian data are available on habits, behavior, food, or reproduction.

Conservation Status: Regarded as threatened (CITES, Appendix II).

Scientific synonyms used for Bolivian specimens are:

Felis yaguarondi eyra Fischer, 1814

Herpailurus yaguarondi: Eisentraut, 1933: 54 (no specimen, but reported from near Villa Montes in Tarija).

Felis yagouarondi: Arce Pereira et al., 1963: 150 (name in list, Todos Santos).

Felis yagouaroundi: Crespo, 1974: 16 (Buenavista). Tello, 1986: 8 (notes on distribution). Cameron et al, 1989: 69 (observations in western Pando). Parker et al., 1993: 102 (reported by local people at Curuyuqui and Perforación).

Felis yagouaroundi eyra: Cabrera, 1958: 196 (first use of name combination). Anderson, 1993: 33 (general distributional records). Anderson et al., 1993: 39 (vicinity of Santa Cruz de la Sierra).

Felis yaguaroundi: Cabot et al., 1986: 43 (undocumented name in list).

Herpailurus yagouaroundi: Salles, 1992: 4 (FMNH 51865).

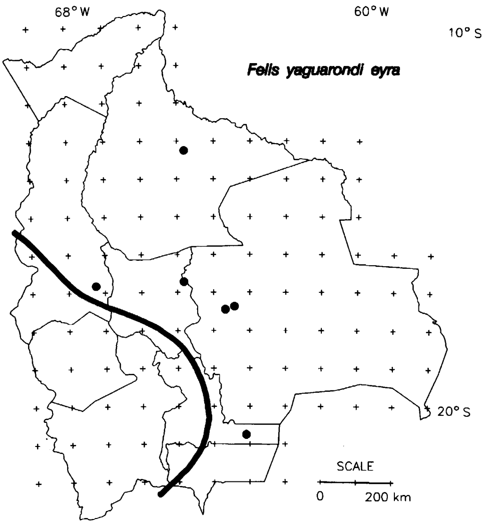


Fig. 644. Localities of known occurrence of *Felis* (*Herpailurus*) *yaguarondi eyra*.

Localities (6) and Specimens (24): **Beni:** 1315/6448, Yutiole, 2 AM. **Cochabamba:** 1643/6449, río Chimoré, 1 CBF. **Chuquisaca:** 2045/6306, 4.5 km by road W of Carandayti, 1 AM. **La Paz:** 1649/6715, Cajuata, 1 MNLP. **Santa Cruz:** 1722/6325, province of Sara, 1 BM (not seen); 1727/6340, Buenavista, 2 ANSP, 8 BM (not seen), 1 CM, 2 MACN (Crespo, 1974), 2 FM. **Department unknown:** "Bolivia" only, 1 AM, 1 EBD, 1 MNLP.

Subgenus (*Leopardus*) Gray, 1842

Leopardus originally included four species, *Leopardus griseus* Gray, *L. pictus* Gray, *L. ellioti* Gray, and *L. horsfieldii* Gray. The first two are from Central America, the last two from the Old World. Pocock (1916: 316) designated *griseus* (= *pardalis*) the type species of the genus *Leopardus*. Wozencraft (*in*

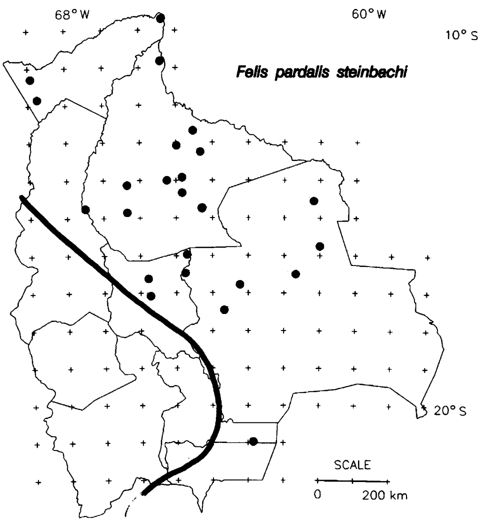


Fig. 645. Localities of known occurrence of *Felis* (*Leopardus*) *pardalis steinbachi.*

Wilson and Reeder, 1993: 291) recognized the genus *Leopardus* Gray, 1842, for *F. pardalis*, *F. tigrinus*, and *F. wiedii*. There is no Bolivian specimen of *F. tigrinus*, but the species probably occurs there.

Felis pardalis Linnaeus, 1758

Ocelot, Ocelote, Gato del Monte, Gato Titi, Gato Onza

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Felis Pardalis* was described by Linnaeus (1758: 42); type locality "America" restricted by Thomas (1911c: 136) to "Mexico," further restricted by Allen (1919: 345) to "State of Vera Cruz."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 12 and 13 are of specimens from 30 km SE of Carandayti (LACM 62852), 50 km NW of Villa Tunari (UM 126851), and Estancia Cachuela Esperanza (MNLP 528). Data for Ibiato in table 11 are from W. Townsend (in litt.).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 645.

HABITAT: Ocelots reach elevations of at least 1000 m (Valle de Pampatambo).

No Bolivian data are available on habits, behavior, food, or reproduction.

CONSERVATION STATUS: Regarded as endangered (CITES, Appendix I).

Scientific synonyms used for Bolivian specimens are:

Felis pardalis steinbachi (Pocock), 1941

Leopardus pardalis: Eisentraut, 1933: 54 (Chaco of Tarija, no definite locality, no specimen). Eisentraut, 1983: 106 (name in list). Salles, 1992: 4, 23 (AMNH 214743, 248723).

Leopardus pardalis steinbachi Pocock, 1941b: 235 (type locality Buenavista, Santa Cruz, Bolivia).

Felis pardalis steinbachi: Cabrera, 1958: 285 (first use of name combination). Suárez Morales, 1986: 41 (undocumented name in list). Anderson, 1993: 33 (general distributional records). Anderson et al., 1993: 38 (vicinity of Santa Cruz de la Sierra).

Felix pardalis: Arce Pereira et al., 1963: 150 (name in list, Todos Santos).

Felis pardalis: Ximenez, 1974, map 5 (Buenavista). Cabot et al., 1986: 43 (undocumented name in list). Cameron et al, 1989: 69 (skin seen in western Pando). Ergueta S. and Salazar B., 1991: 30 (general summary). Emmons, 1991: 72 (seen at Alto río Madidi in La Paz department). Parker et al., 1993: 102 (reported by local people at Curuyuqui and Perforación).

Felis pardalis steinhachi: Tello, 1986: 6 (a misspelling; summary of known distribution, observations, and specimens in MNK as listed below).

LOCALITIES (26) AND SPECIMENS (68): **Beni:** 1049/6525, Guajaramirim, 1 MNK; 1241/6432, río Machupo, 15 km above Horquilla, 1 AM; 1305/6459, San Pablo village, 3 MNK; 1315/6420, Piedras Blancas, 1 MNK; 1355/6450, Las Cusi, 1 MNK; 1400/6515, río Apere, 2 MNK; 1408/6621, Espíritu, 1 IE; 1420/6450, San Pedro, 1 MNK; 1448/6418, Ibiato, 1 CBF, 1 MNK (not seen, W. Townsend, in litt.); 1451/6621, Camandú, 1 MNLP; 1451/6621, Reserva Biológica del Beni, 1 EBD; 1451/6621, Totaisal, 1 EBD, 1 IE; 1545/6100, Los Palmares, 1 MNK; 1630/6140, Zapoco, 1 MNK. **Chuquisaca:** 2058/6251, 30 km SE of Carandayti, 1 LACM. **Cochabamba:** 1558/6442, mouth of río Chapare, 1 AM; 1628/6445, río Ichilo, 52 km S of mouth of río Chapare, 2 AM; 1637/6547, 50 km NW of Villa Tunari, 1 UMMZ; 1705/6543, Valle de Pampatambo, 1 EBD.

La Paz: 1445/6730, río Quiquibey, 1 MNLP. **Pando:** 0942/6523, Abuna, in province of Abuna, 1 (L. Salles, personal commun.); 1117/6855, río Nareuda, 1 AM; 1150/6845, Manuripi Heath National Wildlife Reserve, 3 MNK. **Santa Cruz:** 1433/6111, Aserradero Moira, 1 EBD; 1647/6314, Estancia Cachuela Esperanza, 1 MNLP; 1727/6340, Buenavista, 3 AM, 6 ANSP, 6 BM (not seen), 2 CM (not seen), 6 FM, 2 MACN (Ximenez, 1974). **Department unknown:** perhaps Beni, 5 MNK; no specific locality, 1 FM; "Bolivia" only, 2 CBF, 1 MACN (Ximenez, 1974); exact locality unknown, río Ituri, 1 BM (L. Salles, personal commun.).

Felis wiedii Schinz *in* G. Cuvier, 1821

Margay, Gato Pintado,
Gato Montes, Tigrillo

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Felis Wiedii* was described by Schinz *in* G. Cuvier (1821: 235); type locality "Brasilien" restricted by Allen (1919: 357) to "northern Espirito Santo, Brazil," and further restricted by Cabrera (1958: 290) to "Brasil, restringida al Morro de Arará, sobre el río Mucurí, estado de Baia."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 12 and 13 are of specimens from Buenavista (AM 61788, BM 26.1.5.4, 26.1.12.5, FM 34341). Data for Ibiato in table 11 are from W. Townsend (in litt.).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 646.

HABITAT: All known Bolivian localities are at less than 500 m elevation.

No Bolivian data are available on habits, behavior, food, or reproduction.

CONSERVATION STATUS: Regarded as endangered under CITES Appendix I.

Scientific synonyms used for Bolivian specimens are:

Felis wiedii boliviae (Pocock), 1941

Leopardus wiedii boliviae Pocock, 1941b: 237 (type locality Buenavista, Santa Cruz, Bolivia).

Felis wiedii boliviae: Cabrera, 1958: 288. Suárez Morales, 1986: 40 (undocumented name in list). Anderson, 1993: 33 (general distributional records). Anderson et al., 1993: 39 (vicinity of Santa Cruz de la Sierra).

Felix wiedi: Arce Pereira et al., 1963: 150 (name in list, Todos Santos; also mentioned "margaitigrina" as an alternate name, no specimen).

Felis wiedii: Cabot et al., 1986: 43 (undocumented name in list).

Felis wiedii bolivae: Tello, 1986: 5 (discussed distribution, obtained 7 specimens now in MNK).

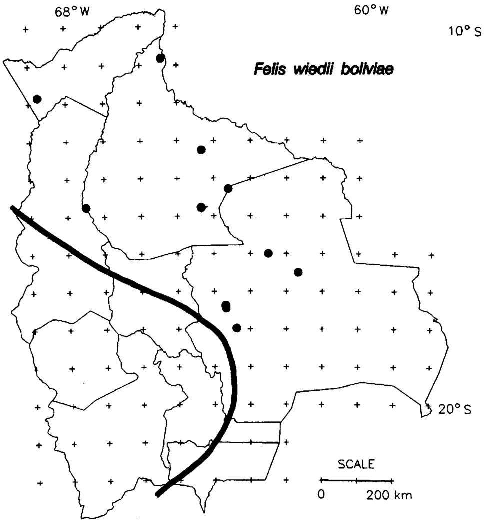


Fig. 646. Localities of known occurrence of *Felis* (*Leopardus*) *wiedii boliviae*.

LOCALITIES (12) AND SPECIMENS (24): **Beni:** 1049/6525, Guajaramirim, 1 MNK; 1315/6420, Piedras Blancas, 3 MNK; 1417/6336, río Palacios, ZSM, unknown number of specimens but probably only one (L. Salles, personal commun.); 1448/6418, Ibiato (not seen, W. Townsend, in litt.); **La Paz:** 1445/6730, río Quiquibey, 1 MNLP. **Pando:** 1150/6845, Manuripi Heath National Wildlife Reserve, 1 MNK. **Santa Cruz:** 1600/6230, Totaitu, 1 MNK; 1630/6140, Zapoco, 1 MNK; 1722/6341, río Dolores, 1 or more ZSM (L. Salles, personal commun.); 1724/6341, río Surutú, 1 or more ZSM (L. Salles, personal commun.); 1727/6340, Buenavista, 1 AM, 2 FM, 2 BM (not seen), 4 MACN (2 reported by Crespo, 1974; not seen); 1759/6323, Quebrado de Espejos, 1 ZSM. **Department unknown:** perhaps Beni, 2 MNK; "Bolivia" only, 1 ANSP, 1 MNLP.

Subgenus (*Lynchailurus*)
Severtzov, 1858

Type species *Felis pajeros* Desmarest from Argentina.

Felis pajeros Desmarest, 1816

Vernacular names applied to the formerly recognized more comprehensive species "*Felis colocolo*" are Pampas Cat, Gato Pajero, and Gato de los Pajonales. García-Perea (1994: 25) suggested the name pampas cat (gato de las pampas) for *F. pajeros*.

TAXONOMIC REMARKS: García-Perea (1994) recognized the genus *Lynchailurus* for three species within "*Felis colocolo*" as previously treated. *Felis Colocola* was named by Molina (1782: 295). Bolivian specimens belong to *Lynchailurus pajeros*. Some names used for Bolivian specimens have type localities outside of Bolivia. *Felis* (*Lynchailurus*) *pajeros garleppi* was described by Matschie (1912: 259), type locality "Cuzco," Peru. Pocock named two different Bolivian cats *steinbachi*, an ocelot and a pampas cat. Because he placed them in two different genera, *Leopardus* and *Lynchailurus*, under the Code (ICZN, 1985) his names may be used as *Leopardus pardalis steinbachi* and *Lynchailurus pajeros steinbachi*. However, both are now often considered to belong to the same genus, *Felis*, and homonymy results. Cabrera (1958: 277) gave reasons for placing *L. pajeros steinbachi* in synonymy with *Felis colocola garleppi*, and as long as this synonymy is recognized the homonomy poses no problem. García-Perea (1994: 27) noted that "there is not enough information to fully evaluate the validity of this subspecies, and until more specimens are studied, I treat it as a separate taxon." If further study warrants the recognition of the subspecies *L. pajeros steinbachi*, and if both this and *Leopardus pardalis steinbachi* are placed in the genus *Felis* rather than in separate genera, then a new name would be needed for the ocelot, which was named later. Considering the uncertain subspecific status of *L. pajeros steinbachi*, I see no real merit in proposing a new name at this time.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 12 and 13 are of a specimen from Tiraqui (BM 34.9.2.31, holotype of *steinbachi*).

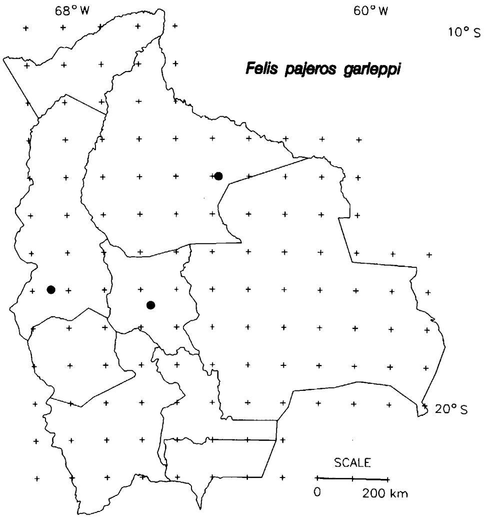


Fig. 647. Localities of known occurrence of *Felis* (*Lynchailurus*) *pajeros garleppi*.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 647.

HABITAT: Ranges from the lowlands up to at least 3200 m elevation at Tiraque.

No Bolivian data are available on habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Felis pajeros garleppi
Matschie, 1912

Lynchailurus pajeros steinbachi Pocock, 1941a: 264 (type locality "Tiraque, Cochabamba, western Bolivia, 4000 m alt.").

Felis colocolo garleppi: Cabrera, 1958: 277 (Tiraque). Anderson, 1993: 32 (general distributional records).

Felis yagouaroundi: Tello, 1986: 8 (misidentification of specimen from Totumu).

Lynchailurus pajeros steinbachi: García-Perea, 1994: 27.

Felis colocolo: Ibáñez et al., 1994: 81 (first specimen from La Paz).

LOCALITIES (4) AND SPECIMENS (6): **Beni:** 1400/6350, Los Totumu, 1 MNK. **Cochabamba:** 1725/6543, Tiraque, 1 BM. **La Paz:** 1658/6829, Comanche, 1 EBD. **Santa Cruz:** coordinates uncertain, near Sirarani, 1 ZF (R.

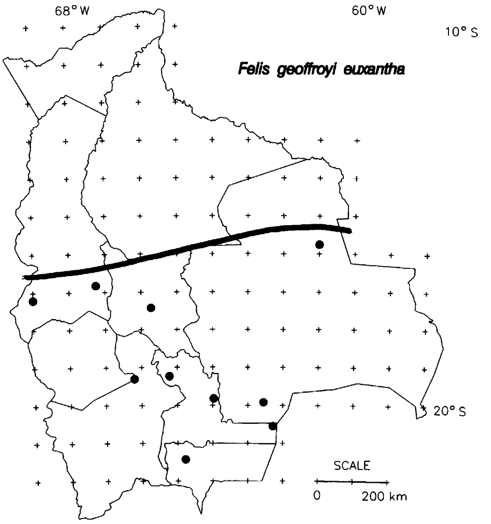


Fig. 648. Localities of known occurrence of *Felis* (*Oncifelis*) *geoffroyi euxantha*.

Hutterer, in litt.). **Department unknown:** "Bolivia," 2 EBD.

Subgenus (*Oncifelis*) Severtzov, 1858

Felis geoffroyi d'Orbigny and Gervais, 1844

Felis geoffroyi has been placed at various times in the genera or subgenera *Leopardus* and *Oncifelis*. Vernacular names are Geoffroy's Cat and Gato Montes.

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Felis Geoffroyi* was described by d'Orbigny and Gervais (1844: 40), type locality "des rives du Rio Negro, en Patagonie."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 12 and 13 are of specimens from Tiraque (BM 34.9.2.37), Pulque (AM 39010), and the río Cachimayo (AM 39004).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 648.

HABITAT: Ranges from the lowlands up to at least 3300 m elevation at Tiraque.

No Bolivian data are available on habits, behavior, or food.

REPRODUCTION: A young animal with milk teeth was taken in July.

CONSERVATION STATUS: Regarded as endangered (CITES, Appendix I).

Scientific synonyms used for Bolivian specimens are:

Felis geoffroyi euxantha (Pocock), 1940

Oncifelis geoffroyi euxanthus Pocock, 1940: 352 (type locality "Tiraqui, Cochabamba district in the Bolivian highlands, 3300 m.").

Felis geoffroyi euxantha: Cabrera, 1958: 279 (first use of name combination). Ximenez, 1975: 2 (photo of skin of holotype). Anderson, 1993: 32 (general distributional records).

Felis (*Leopardus*) *geoffroyi euxanta*: Cabrera, 1961b: 188 (a misspelling).

Felis (*Leopardus*) *geoffroyi*: Nowak and Paradiso, 1983: 1065 (Bolivia, subgeneric assignment).

Felis geoffroyi: Ibáñez et al., 1994: 81 (first specimen from Santa Cruz).

LOCALITIES (10) AND SPECIMENS (22): **Chuquisaca:** 1914/6513, Pulque, 1 AM; 1949/6358, 2 km SW of Monteagudo, 1 MNLP; 2033/6217, Bolivian border near Sargento Rodriguez, Paraguay, 3 Univ. Connecticut (perhaps one is from Bolivia). **Cochabamba:** 1725/6543, Tiraque, 1 BM (holotype). **La Paz:** 1649/6715, Cajuata, 1 MNLP; 1712/6900, Achiri, 1 CBF. **Potosí:** 1918/6612, río Cachimayo, 1 AM. **Santa Cruz:** 1545/6100, Los Palmares, 1 MNK; 1955/6233, Perforación, 50 km S of Cerro Colorado, 2 EBD; **Tarija:** 2126/6447, San Lorenzo, 1 ANSP (perhaps of this species). **Department unknown:** perhaps Beni, 5 MNK; "Bolivia" only, 1 BM, 1 EBD, 2 MNLP, 1 MACN (not seen).

Subgenus (*Oreailurus*) Cabrera, 1940

Type species is *Felis jacobita* Cornalia by original designation.

Felis jacobita Cornalia, 1865

Andean Cat, Gato Andino, Gato Lince, Oscalla

TAXONOMIC REMARKS: Wozencraft (*in* Wilson and Reeder, 1993: 294) recognized the genus *Oreailurus* Cabrera, 1940, for *F. jacobita*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: No measurements are available

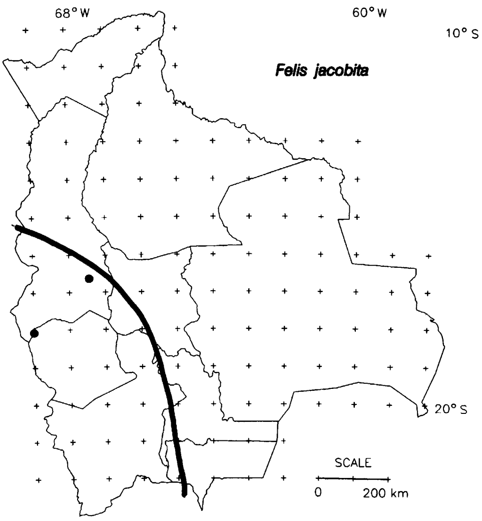


Fig. 649. Localities of known occurrence of *Felis* (*Oreailurus*) *jacobita*.

from Bolivian specimens. Measurements in tables 12 and 13 are of a specimen (MVZ 116317) from Peru.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 649. The type locality is a mountainous region, between Potosí, Bolivia, and "Humacuaca" (presumably Humahuaca, Argentina), and so the type might have come from either country. Cornalia (1865) on the plate noted "della Republica Argentina," although he noted "Bolivia" in text. This technical detail is not of any taxonomic consequence now.

HABITAT: The Altiplano, generally above 3000 m elevation.

No Bolivian data are available on habits, behavior, food, or reproduction.

CONSERVATION STATUS: Regarded as endangered (CITES, Appendix I).

Scientific synonyms used for Bolivian specimens are:

Felis jacobita Cornalia, 1865: 2 (type locality "Bolivia, circa Potosi et Humacuaca in montibus sat elevatis"). Cabrera, 1940: 16 (discussed status of the species and distinguished it from *Felis colocola*). Cabrera, 1958: 297. Kuhn, 1973: 360 (specimen from market in La Paz, exact locality unknown, third reported skull of the species). Suárez, 1986: 55 (undocumented name in list). Tello, 1986: 10 (reports for higher areas of Oruro, Potosí, Tarija, and Chuquisaca departments). Scrocchi and Halloy, 1986: 157 (map, cited three Bolivian records). Salazar Bravo, 1990: 189 (Campamento Khastor). Ergueta S. and Salazar B., 1991: 28 (general summary). Anderson, 1993: 32 (general distributional records). Yensen and Tarifa, 1993: 54 (8 km NW, not NE as published, of Sajama and 8 km ESE of Sajama). Yensen et al., 1994: 409 (1805/6904, 1809/6854, 1854/6647).

Felis (*Oreailurus*) *jacobita*: Nowak and Paradiso, 1983: 1065 (Bolivia, subgeneric assignment). Cabrera, 1961b: 204.

Oreailurus jacobita: Wozencraft *in* Wilson and Reeder 1993: 294 (use of name).

LOCALITIES (9) AND SPECIMENS (14): **La Paz:** 1638/6727, Saya, 1 CBF; exact location uncertain, Yungas east of La Paz, 1 ANSP (skin only); exact location uncertain, from market in La Paz, 1 (skull only; Kuhn, 1973). **Oruro:** 1805/6904, 8 km NW of Sajama, 1 CBF; 1809/6854, 8 km ESE of village of Sajama, Jiskha Khara Huichinca Loma, 1 CBF; 1854/6647, Challapata area, 1 CBF (Yensen et al., 1994: 409). **Potosí:** 2212/6658, 3 km NE of Khastor, 1 CBF; 2217/6701, Khastor, 3 MNLP; exact location uncertain, Cerro Willacollo, 1 CBF. **Potosí (probably):** type locality, 1 (Cornalia, 1865). **Tarija:** exact locality unknown, 1 CBF. **Department unknown:** "Bolivia" only, 1 BM (trade skin, locality uncertain).

Felis, not identified to subgenus or species

LOCALITIES (8) AND SPECIMENS (18): **Beni:** 1315/6420, Piedras Blancas, 1 MNK (perhaps *concolor*); 1448/6418, Ibiato, 1 CBF (not seen, W. Townsend, in litt.); 1451/6621, Totaisal, 1 CBF; exact locality unknown, río Beni, 1 US (not seen, partial skin only); coordinates unknown, Arroyo Salinas on Río Sécure, 1 CBF. **Cochabamba:** 1741/6536, 7.5 km SE of Rodeo, 1 collection uncertain. **Pando:** 1058/6609, Pira, Madre de Dios (L. Salles, personal commun.). **Santa Cruz:** 1658/6335, 15 km N of Santa Rosa, 1 EBD (not seen); 1722/6325, province of Sara, 1 BM (not seen); 1727/6340, Buenavista, 2 BM (not seen); exact locality unknown, "Santa Cruz," 1 UMMZ (very young, in alcohol, too small for *P. onca*, otherwise not readily identifiable). **Department unknown:** perhaps Beni, 1 MNK; "Bolivia" only, 1

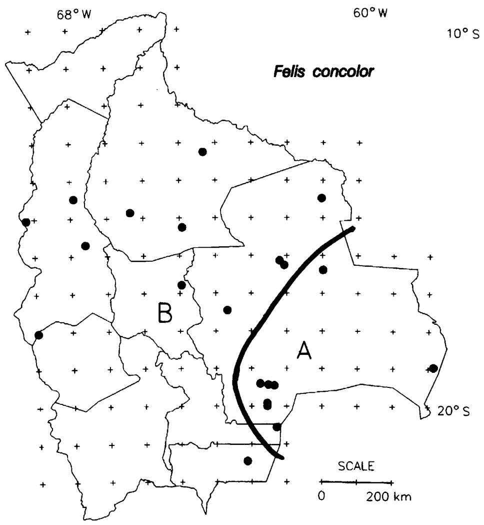


Fig. 650. Localities of known occurrence of two subspecies of *Felis* (*Puma*) *concolor*, *F. c. acrocodia* (A) and *F. c. osgoodi* (B).

BM, 2 FM, 1 MACN (not seen); perhaps Bolivia, 2 MNLP.

Subgenus (*Puma*) Jardine, 1834

Type species *Felis concolor* Linnaeus, by original designation. Wozencraft (*in* Wilson and Reeder, 1993: 296) recognized the genus *Puma* Jardine, 1834, for *P. concolor.*

Felis concolor Linnaeus, 1771

Puma, Leon Americano

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Felis concolor* was described by Linnaeus (1771: 522); type locality "Brassilia" restricted by Goldman (*in* Young and Goldman, 1946: 200) to "Cayenne region, French Guiana." Pilleri (1977b: 48) used the name *Panthera concolor* in a list of common Bolivian mammals. *Felis concolor acrocodia* was described by Goldman (1943: 230), type locality Descalvados, Mato Grosso, Brazil.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in table 12 are estimates. No Bolivian data are available.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 650. Occurs throughout the country, but populations have been reduced or eliminated in areas with dense human populations. This trend will continue.

HABITAT: Occurs in all major HABITATS: from dense forest at low elevations to barren slopes of the highest elevations.

No Bolivian data are available on habits, behavior, food, or reproduction.

CONSERVATION STATUS: CITES status is Appendix II.

Scientific synonyms for Bolivian subspecies are given under subspecies below:

Felis concolor acrocodia
Goldman, 1943

Felis concolor acrocodia: Cabrera, 1958: 291 (extreme southeastern Bolivia). Currier, 1983: 3 (map, general information on the species). Suárez Morales, 1986: 39, 52 (undocumented name in list). Anderson, 1993: 32 (general distributional records).

Felis concolor osgoodi Nelson and Goldman, 1929: 349 (in part, specimen from Puerto Suárez).

Felis (*Puma*) *concolor*: Nowak and Paradiso, 1983: 1065 (no specific reference to Bolivia, subgeneric assignment).

Felis concolor: Parker et al., 1993: 39, 102 (reported at Curuyuqui, seen at Perforación, and skin seen at Yanaigua).

LOCALITIES (8) AND SPECIMENS (11): **Chuquisaca:** 2033/6217, Bolivian border near Sargento Rodriguez [Paraguay], 5 Univ. Connecticut. **Santa Cruz:** 1623/6059, San Ignacio de Velasco (L. Salles, personal commun.); 1857/5751, Puerto Suárez, 1 CM (now lost); 1924/6245, Bañados de Isozog, 1 EBD; 1926/6231, near Guaripembi, 1 EBD; 1927/6221, Cerro Colorado, 1 EBD; 1955/6233, Perforación, 50 km S of Cerro Colorado, 1 EBD; 2000/6233, 58 km S of Cerro Colorado, 1 EBD.

No measurements are included in tables for this subspecies.

Felis concolor osgoodi
Nelson and Goldman, 1929

Felis concolor osgoodi Nelson and Goldman, 1929: 348 (type locality Buenavista, Santa Cruz, Bollivia). Anderson, 1993: 32 (general distributional records). Anderson et al., 1993: 38 (vicinity of Santa Cruz de la Sierra). Yensen and Tarifa, 1993: 53 (photo at CBF of skin from río Junthuma Khuchu). Yenson et al., 1994: 410 (1805/6904).

Felis concolor: Créqui Montfort and Sénéchal de la Grange, 1904: 97 (sign seen near Yura). Jungius, 1974: 378 (droppings seen SW of Pelechuco, no specimen). Cabot et al., 1986: 43 (undocumented name in list). Hershkovitz, 1987b: 75 ("Bolivia," no specific locality). Tello, 1986: 9 (discussion of distribution and current status). Cameron et al, 1989: 69 (skin seen in western Pando). Stearman, 1990: 380 (Yuquí camp at 1647/6457). Mercado Tudor and Miralles Goytia, 1991: 295 (La Paz valley). Ergueta S. and Salazar B., 1991: 28 (general summary).

Puma concolor: Gay and Best, 1995: 151 (studied five Bolivian specimens, exact localities not given).

LOCALITIES (15) AND SPECIMENS (27): **Beni:** 1315/6420, Piedras Blancas, 1 MNK; 1451/6621, Reserva Biológica del Beni, 1 EBD; 1515/6455, 15 km W of Loreto, 1 AM. **Cochabamba:** 1647/6457, Campamento Yuquí, 1 MNLP. **Chuiquisaca:** exact locality unknown, upper río Pilcomayo, 6 Frankfurt (H. Felton, in litt.). **La Paz:** 1428/6754, 30 km NW of San Buenaventura, 1 AM; 1502/6913, Ulla Ulla, 1 EBD; 1542/6736, 20 km N of Caranavi, 1 MSU. **Oruro:** 1805/6904, 8 km NW of village of Sajama, Jiskha Khara Huichinca Loma, 1 CBF. **Santa Cruz:** 1428/6102, Laguna Bahia Chaplin, 1 EBD; 1608/6212, Concepción, 2 MNLP; 1615/6204, cercanias de Concepción, 1 EBD; 1727/6340, Buenavista, 2 CM (one now lost), 4 BM (not seen), 1 FM (holotype); coordinates unknown, Tupiriqui, 1 MNK. **Tarija:** 2127/6307, Palo Marcado, 1 Forschunginstitut Senckenberg (L. Salles, personal commun.).

Measurements in tables 11 and 12 are of specimens from 15 km W of Loreto (AM 214740), 30 km W of San Buenaventura (AM 247713), and 20 km N of Caranavi (MSU 28254).

Felis concolor, subspecies not determined

LOCALITIES (?) AND SPECIMENS (9): **Department unknown:** no specific locality, 1 FM; Bolivia, 1 BM (not seen), 1 Paris (not seen); perhaps Bolivia, 4 CM, 1 MNLP; coordinates unknown, 20 km W of Aydayo, 1 US (not seen, L. Salles, in litt.).

Genus *Panthera* Oken, 1816

Wozencraft (*in* Wilson and Reeder, 1993: 197) recognized the subfamily Pantherinae and the genus *Panthera* Oken, 1816, for *P. onca* and some of the large Old World cats. The generic name *Panthera* as used by Oken, 1816, was for a time not available under the International Code of Zoological Nomenclature because the work was not consistently binomial and, furthermore, this publication specifically was ruled unavailable for nomenclatorial purposes by the International Commission on Zoological Nomenclature. However, the commission later ruled that *Panthera* Oken, 1816, was to be made available as a special case (Tubbs, 1985, International Commission on Zoological Nomenclature, Opinion 1368). In this erratic fashion we have approached the goal of nomenclatorial stability.

Panthera onca
(Linnaeus), 1758

Jaguar, Yaguarete, Tigre Americano

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Felis Onca* was described by Linnaeus (1758: 42); type locality "America *meridionali*" restricted by Thomas (1911c: 136) to "Pernambuco," Brazil. *Felis palustris* was described by Ameghino (1888: 6), type locality Lujan, province of Buenos Aires, Argentina, in upper Pleistocene deposit. *Felis onca peruviana* was described by Blainville (1843, plate 8); type locality Peru, restricted to "Moyobamba; departamento de San Martin" by Cabrera (1958: 300). Nelson and Goldman (1933: 230) revised the species but had no Bolivian record of this subspecies. Assignment of specimens to *P. o. peruviana* is based on zoogeographic considerations, not on evaluation of characters, and should be regarded as a hypothesis for later testing. Geographic variation needs to be critically reviewed.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Cranial measurements of two were published by Pilleri (1977b: 39).

DISTRIBUTIONAL NOTES: Guggisberg (1975) noted "one record of 2700 m (8860 ft.), from Bolivia" but the source of this record was not cited. This report was cited by Neff (*in* Coheleach et al., 1982) who also cited Perry (1970) as a source, and it was cited later by Seymour (1989). Perry gave no elevation although he noted that "when Henry Rusby was in Bolivia in 1885 he encountered a native jaguar hunter in the cinclona [= cinchona] region of the Mapiri. . . ." Rusby (1933) reported meeting a jaguar hunter in the town of Mapiri. Collecting localities near Mapiri cited by other authors range from 750 to 1400 m elevation. The occurrence of jaguars at 2700 m elevation seems unsubstantiated at this time. Known localities are listed below and mapped in figure 651.

HABITAT: Generally in forests or savannahs at low elevations, see preceding paragraph.

No Bolivian data are available on habits, behavior, food, or reproduction.

CONSERVATION STATUS: Regarded as endangered (CITES, Appendix I). Hunting by humans and killing to protect livestock have reduced populations in some areas. Further reductions are to be expected.

Scientific synonyms used for Bolivian specimens are given under subspecies below.

Panthera onca palustris
Ameghino, 1888

Felis onca milleri: Nelson and Goldman, 1933: 226 (Lake Uberaba on Brazilian border).

Felis onca boliviensis Nelson and Goldman, 1933: 229 (type locality Buenavista, Santa Cruz, Bolivia).

Panthera (*Jaguarius*) *onca onca*: Vieira, 1955: 452 ("Bolivia").

Leo onca palustris: Cabrera, 1958: 299 (synonymized *boliviensis*, *milleri*, and *palustris*).

Felix onca: Arce Pereira et al., 1963: 150 (name in list; Todos Santos, río Chapare; *Pantera onca* given as alternative name).

Felis onca palustris: Suárez Morales, 1986: 40 (undocumented name in list). Anderson et al., 1993: 38 (vicinity of Santa Cruz de la Sierra).

Felis onca: Suárez Morales, 1986: 121 (undocumented name in list). Ergueta and Salazar, 1991: 29 (general summary).

Panthera onca: Pilleri, 1977b: 48 (name in list). Eisentraut, 1983: 106 (name in list). Tello, 1986: 11 (notes on observations and reports in areas here assigned to both the subspecies *palustris* and *peruviana*). Swank and Teer, 1989: 17 (map showing presumed population status). Cameron et al., 1989: 69 (skull and feces observed in western Pando). Seymour, 1989: 1 (general summary on the species; map showed range in Bolivia but did not indicate subspecies boundaries). Parker et al., 1993: 39, 102 (reported as common at Curuyuqui in 1991, reports of local people at Perforación). Vargas and Mendez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area).

Panthera onca palustris: Anderson, 1993: 33 (general distributional records).

LOCALITIES (9) AND SPECIMENS (14): **Chuquisaca:** 2033/6217, Bolivian border near Sargento Rodriguez [Paraguay], 1 Univ. Connecticut; 2058/6251, 30 km SE of Carandayti, 1 LACM. **Santa Cruz:** 1727/6340, Buenavista, 3 BM (not seen), 3 FM; 1730/5750, Lake Uberaba, 1 US; 1748/6310, "Santa Cruz" (assumed to be the city), 1 UMMZ; 1835/6213, 17 km S and 5 km W of Tita, 1 MNLP; 1924/6245, Bañados de Isozog, 1 EBD; 2000/6233, Santa Ana, 89 km S of Cerro Colorado, 1 EBD. **Tarija:** 2104/6257, 8 km NE of Capirenda, 1 LACM.

Measurements in tables 12 and 13 are of specimens from Santa Cruz (UM 54974), 8 km NE Capirenda (LACM 51569), and (FM 34344, holotype of *boliviensis*).

Panthera onca peruviana
Blainville, 1843

Panthera onca: Pilleri, 1977b: 39 (cranial measurements of two, from río Ipurupuru and Laguna de Mamoré).

Felis onca: Cabot et al., 1986: 43 (undocumented name in list). Tello, 1986: 11 (discussion of distribution and current status throughout the country). Emmons, 1991: 72 (seen at Alto río Madidi in La Paz department).

Panthera onca peruvianus: Anderson, 1993: 33 (general distributional records).

LOCALITIES (13) AND SPECIMENS (14): **Beni:** 1213/6513, Cascajal, 1 AM; 1241/6432, río Machupo, 15 km above Horquilla, 1 AM; 1301/6248, Mategua, 1 AM; 1347/6438, río Iprupuru, Trinidad (no. 677; Pilleri, 1977b: 39); 1410/6449, Laguna de Mamoré, near the Estancia La Havana (no. 678; Pilleri, 1977b: 39); 1415/6550, Estancia Venecia, 1 EBD; 1450/6622, Los Tajibos, 1 EBD; 1451/6617, río Matos, 2 EBD; 1451/6621, EBB, 1 CBF; 1451/6621, Totaisal, 1 EBD; 1453/6453, 15 km SE of Puerto Julio, 1 AM; 1503/6630, Aserradoro El Triunfo, 1 MNK;

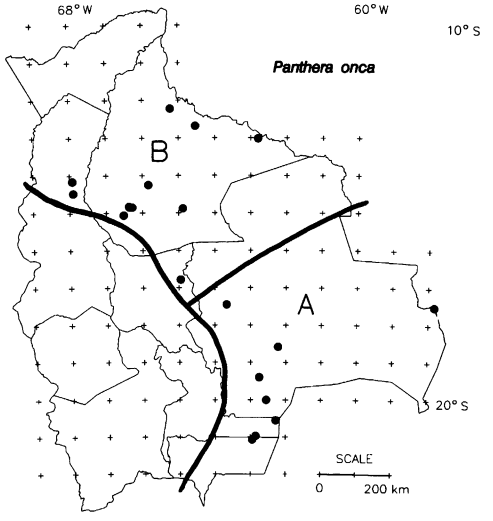


Fig. 651. Localities of known occurrence of two subspecies of *Panthera onca*, *P. o. palustris* (A) and *P. o. peruviana* (B).

coordinates unknown, 2 leagues from San Lorenzo (1501/6438), SW of Manipuri, 1 IE; coordinates unknown, río Beni, 6 MACN (not seen); perhaps Beni, 1 MNK. **Cochabamba:** 1647/6457, Campamento Yuqui, 1 MNLP. **La Paz:** 1409/6755, Tumapaso, 1 IE; 1428/6754, 30 km W of San Buenaventura, 1 MNLP.

Measurements in tables 12 and 13 are of specimens from Mategua (AM 209135) and 15 km above Horquilla on the río Machupo (AM 209136).

Panthera onca

LOCALITIES (1) AND SPECIMENS (6): **Department unknown:** "Bolivia" only, no specific locality, 1 Paris (not seen), 1 MNLP, 4 MACN (not seen).

FAMILY MUSTELIDAE FISCHER, 1817

Six living genera occur in Bolivia.

SUBFAMILY LUTRINAE BONAPARTE, 1838

Wozencraft (*in* Wilson and Reeder, 1993: 311) used the generic name *Lontra* for American otters, including *L. longicaudis*, following van Zyll de Jong (1972: 81, 82). In a key, *Lontra* was said to have "postorbital processes poorly developed, the distance between them less than the distance from tip of postorbital process to distal end of the median suture of nasals," in contrast to *Lutra* with "postorbital processes well developed, the distance between them greater than the distance from tip of postorbital process to distal end of the median suture of nasals." Other characters were given in a diagnosis of *Lontra* (p. 84) but not specifically contrasted with *Lutra*, for which no diagnosis was given. The penis bone or baculum (p. 42) of *Lontra* differs from that of *Lutra* in being longer, both relative to its width and relative to the size of the animal, and in lacking or having less conspicuous distal bifurcation. The primary evidence for separate genera seems to be a phenetic analysis of 48 characters (p. 67). This is interesting and suggestive, but how much similarity may be the result of convergence or adaptation to similar food habits rather than to recency of common ancestry is an open question. Until this phylogenetic question can be more fully addressed, I am inclined to continue to use the broader concept of the genus *Lutra*.

Genus *Lutra* Brünnich, 1771

Lutra longicaudis Olfers, 1818

River Otter, Londra,
Lobito de Rio, Nutria

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *L[utra] longicaudis* was described by Olfers (1818: 233), type locality "Brasilien." *Lutra enudris* was described by Cuvier (1823: 242); type locality Guayana restricted by Cabrera (1958: 272) to "rio Maroni" between Surinam and French Guiana.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 12 and 13 are of specimens from the río Iténez near Costa Marquez (AM 209133), Cerro Hosana (CM 4929), and the río Surutú (CM 4955).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 652.

HABITAT: Rivers and lakes of the lowlands.

No Bolivian data are available on habits, behavior, food, or reproduction.

CONSERVATION STATUS: Regarded as endangered (CITES, Appendix I).

Scientific synonyms used for Bolivian specimens are:

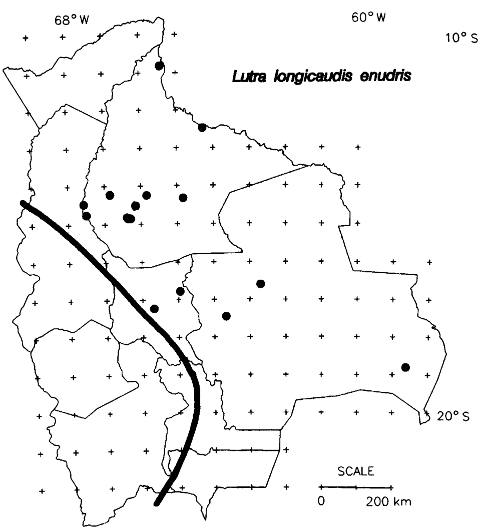


Fig. 652. Localities of known occurrence of *Lutra longicaudis enudris.*

Lutra longicaudis enudris
Cuvier, 1823

Lontra longicaudis enudris: van Zyll de Jong, 1972: 100 (río Iténez, Buenavista, San Fermin).

Lutra longicaudis: Cabot et al., 1986: 43 (undocumented name in list). Tello, 1986: 26 (observed at Piedras Blancas, in the río Itonamas at Tacuarali and Los Totumu, in the río Negro at about 15°15′S, 62°40′W, and in the río Manuripi at Laguna Bay). Ergueta and Salazar, 1991: 26 (general summary). Emmons, 1991: 72 (seen at Alto río Madidi in La Paz department). Parker et al., 1993: 54 (seen at San Fernando in 1991, reported by local people at Curuyuqui).

Lutra longicaudis enudris: Suárez Morales, 1986: 40 (undocumented name in list). Anderson, 1993: 32 (general distributional records). Anderson et al., 1993: 38 (vicinity of Santa Cruz de la Sierra).

L[utra]. platensis: Suárez Morales, 1986: 40 (undocumented name as a synonym in list).

LOCALITIES (17) AND SPECIMENS (30): **Beni:** 1049/6525, Guajaramirim, 1 MNK; 1229/6417, río Iténez, near Costa Marquez [Brazil], 1 AM (van Zyll de Jong, 1972, cited 2); 1411/6653, San Rosa, 1 CBF; 1415/6550, Estancia Venecia, 1 EBD; 1420/6450, San Pedro, 1 MNLP; 1428/6610, Estación Catmandú, río Matos, 1 CBF; 1428/6734, Rurrenabaque, 1 MSB; 1449/6623, banks of río Normandia, 1 EBD; 1451/6617, río Matos, 6 km E of Estación Biológica del Beni, 1 AM, 1 EBD; 1451/6621, Totaisal, 1 EBD, 3 MNLP. **Cochabamba:** 1647/6457, Campamento Yuqui, 1 MNLP; 1714/6541, Incachaca, 1 CM (not seen). **La Paz:** 1445/6730, río Quiquibey, 1 MNLP. **Santa Cruz:** 1636/6242, 10 km N of San Ramón, 1 AM; exact locality unknown, río Surutú, Cerro Hosana, 3 CM; 1727/6340, Buenavista, 1 FM (not seen), 3 BM (2 not seen); 1848/5837, San Fermin, 1 Stockholm (van Zyll de Jong, 1972). **Department unknown:** perhaps Beni, 2 MNK; perhaps Bolivia, 2 MNLP.

Genus *Pteronura* Gray, 1837

The genus contains only one species.

Pteronura brasiliensis
(Gmelin *in* Linnaeus, 1788)

Regarded as endangered (CITES, Appendix I). Vernacular names are giant otter, nutria gigante, lobo del río grande, arirai.

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Mustela Lutris brasiliensis* was described by Gmelin (*in* Linnaeus, 1788: 93); type locality "in fluviis americae meridionalis" restricted by Cabrera (1958: 274) to "rio São Francisco, en la orilla correspondiente al estado de Alagoas," Brazil. *Lutra paranensis* was described by Rengger (1830: 126); type locality Paraguay restricted by Cabrera (1958: 275) to "río Paraná." Pohle (1920: 122) first used the name combination *Pteronura brasiliensis paranensis.*

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in table 13 are of a specimen from Ecuador (AM 71858) and a skull from "Bolivia" (MACN 33.155), and a skull perhaps from Bolivia (MNK uncatalogued).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 653.

HABITAT: Rivers and lakes of the lowlands.

No Bolivian data are available on habits, behavior, food, or reproduction.

CONSERVATION STATUS: Populations much reduced because of hunting for their fur. Now rare. Regarded as endangered (CITES, Appendix I).

Scientific synonyms used for Bolivian specimens are:

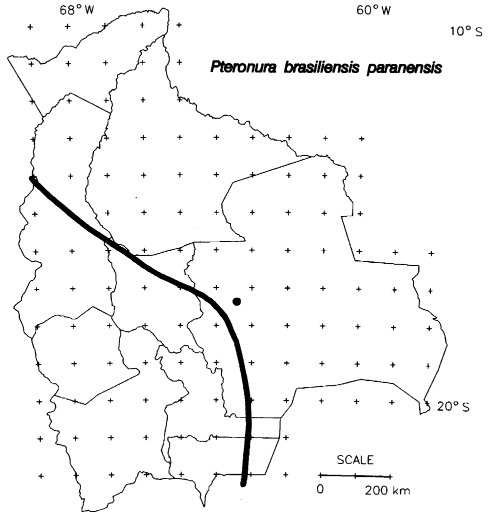


Fig. 653. Locality of known occurrence of *Pteronura brasiliensis paranensis.*

Pteronura brasiliensis paranensis (Rengger), 1830

Pteronura brasiliensis paranensis: Crespo, 1974: 15 (Bolivia only and Cerro Amboró). Suárez Morales, 1986: 40 (undocumented name in list). Anderson et al., 1993: 38 (vicinity of Santa Cruz de la Sierra).

Pteronura brasiliensis: Nowak and Paradiso, 1983: 1016 (Bolivia). Suárez Morales, 1986: 123 (undocumented name in list). Cabot et al., 1986: 43 (undocumented name in list). Tello, 1986: 25 (discussion of current status). Cameron et al., 1989: 69 (said to have been observed in western Pando). Ergueta and Salazar, 1991: 27 (general summary). Anderson, 1993: 32 (Cerro Amboró). Parker et al., 1993: 54 (reports by local people at San Fernando in 1991).

LOCALITIES (2) AND SPECIMENS (6): **Santa Cruz:** 1722/6325, Cerro Amboró, in province of Sara, 1 MACN (Crespo, 1974). **Department unknown:** coordinates unknown, río Chusmas, 5 km W of Las Madrejones, 1 IML; "Bolivia" only, 1 MACN (Crespo, 1974), 2 MNLP; probably Bolivia, no label, 1 MNK.

SUBFAMILY MEPHITINAE
BONAPARTE, 1845

Genus *Conepatus* Gray, 1837

Conepatus chinga (Molina), 1782

Skunk, Comadreja, Anatuya (Quechua), Anas (Aimara), Zorrino

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. Molina (1782: 288) named *Viverra Chinga*; type locality "Chili" restricted by Cabrera (1958: 266) to "alrededores de Valparaiso." *Conepatus arequipae* was described by Thomas (1902b: 223); type locality "Sumbay, Province of Arequipa, S[outhern]. Peru. Alt. 4000 m." The recognition here of only one subspecies within Bolivia reflects a rather subjective judgment that the degree of difference among the Bolivian specimens is probably not greater than might be found within a single population of one species if an adequate sample were available from Bolivia for study. In a revision of *Conepatus*, Kipp (1965) did not include study of Bolivian specimens but suggested that no more than two species should be recognized in the genus in South America and used the name *Conepatus chinga rex* for all Bolivian skunks. Van Gelder (1968) published a study of a sample of 103 *Conepatus* from Uruguay and described considerable variation within the population there. These may eventually be assigned to the same species as the Bolivian material. Color patterns are also highly variable in the North American skunk *Mephitis mephitis* (Anderson and Anderson, 1982).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 12 and 13 are of specimens from Tujma (AM 39011), 5 km E of Ulla Ulla (AM 247712), 5 km SE of Tita (AM 260327), 6 km W of Carandayti (MSB 56102), Sahama (BM 98.3.16.4, holotype of *rex*), Cochabamba (BM 2.1.1.15, holotype of *porcinus*), Choro (BM 2.1.1.11, holotype of chorensis, and 2.1.1.12 to 14).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 654.

HABITAT: Occupy various HABITATS: from the lowlands of southeastern Bolivia to the Altiplano.

No Bolivian data are available on habits, behavior, food, or reproduction.

PARASITOLOGY: The flea *Hectopsylla conigger* was reported from Pampa Olliga [= Aullaga] (Hopkins and Rothschild, 1953: 63).

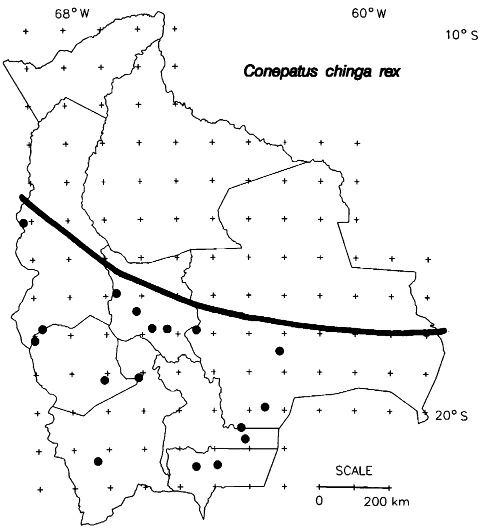


Fig. 654. Localities of known occurrence of *Conepatus chinga rex.*

Conservation Status: Not found to be extremely common anywhere but not in need of special attention.

Scientific synonyms used for Bolivian specimens are:

Conepatus chinga rex Thomas, 1898

Conepatus rex Thomas, 1898a: 278 (type locality "Esperanza ,. . . in the La Paz department, neighborhood of Mount Sajama, Bolivia). Neveu-Lemaire and Grandidier, 1911: 7 (cited this and three names below from Thomas).

Conepatus chorensis Thomas, 1902a: 126 (type locality Choro, Cochabamba, Bolivia); 1926b: 320 (Carlazo).

Conepatus porcinus Thomas, 1902a: 128 (type locality Cochabamba, Cochabamba, Bolivia).

Conepatus arequipae Thomas, 1902b: 223 (Pampa Aullaga, Oruro, Bolivia). Hopkins and Rothschild, 1953: 63 (fleas from Pampa Aullaga).

Conepatus chinga rex: Kipp, 1965: 227 (revision of genus). Suárez Morales, 1986: 39 (undocumented name in list). Mercado and Miralles, 1991: 295 (La Paz valley). Anderson, 1993: 32 (general distributional records). Yensen and Tarifa, 1993: 53 (1 km SE of Sajama).

Conepatus chinga: Salazar Bravo, 1990: 189 (12 km E of Alota). Ergueta and Salazar, 1991: 26 (general summary). Parker et al., 1993: 102 (reported at Curuyuqui, reported by local people at Perforación).

Localities (18) and Specimens (24): **Chuquisaca:** 2045/6307, 6 km by road W of Carandayti, 1 MSB. **Cochabamba:** 1656/6642, Choro, 4 BM; 1724/6609, Cochabamba, 1 BM; 1751/6543, 30 mi [= 48 km] S of Tiraque, 1 US; 1752/6518, Tujma, 1 AM. **La Paz:** 1502/6913, 5 km E of Ulla Ulla, 1 AM; 1749/6847, Esperanza, 1 BM (Thomas, 1898a). **Oruro:** 1807/6900, Sahama, 1 BM; 1807/6900, 1 km SE of Sajama, 1 CBF (Yensen and Tarifa, 1993: 53); 1908/6607, 7 km S and 4 km E of Cruce Ventilla, 1 MSB; 1911/6705, Pampa Aullaga, 1 BM (Thomas, 1902b). **Potosí:** 2118/6720, 30 km NE of Alota, 1 MNLP. **Santa Cruz:** 1754/6429, Comarapa, 1 BM; 1827/6208, 5 km SE of Tita, 1 AM; 1955/6233, Estancia Perforación, 1 EBD; 2027/6314, 1 km S and 4.5 km E of Boyuibe, 1 MNK. **Tarija:** 2126/6355, Tapecua, 1 AM, 1 MSB; 2128/6432, Carlazo, 2 BM. **Department unknown:** Bolivia only, 1 BM.

SUBFAMILY MUSTELINAE FISCHER, 1817

Genus *Eira* C. E. Hamilton Smith, 1842

One living species is recognized.

Eira barbara (Linnaeus), 1758

Eira or Tayra,
Melero, Huron Mayor

Taxonomic Remarks: The name of the species has its type locality outside of Bolivia; [*Mustela*] *barbara* was described by Linnaeus (1758: 46); type locality "Brasilia" restricted by Lönnberg (1913: 19) to "Pernambuco." *Galictis barbara*, var. *peruana* was described by Nehring (1886: 186); type locality forests of Peru to the east of the central cordillera, restricted by Cabrera (1958: 264) to "Yurac Yacu, departmento de San Martín."

Morphological Characters and Comparisons: Weights in kilograms range from at least 2.39 to 2.96 in *Eira barbara barbara.*

Distributional Notes: Known localities are listed below and mapped in figure 655.

Habitat: Occupy various Habitats: from the lowlands up to at least 1650 m elevation (Serranía Bella Vista) in the Yungas.

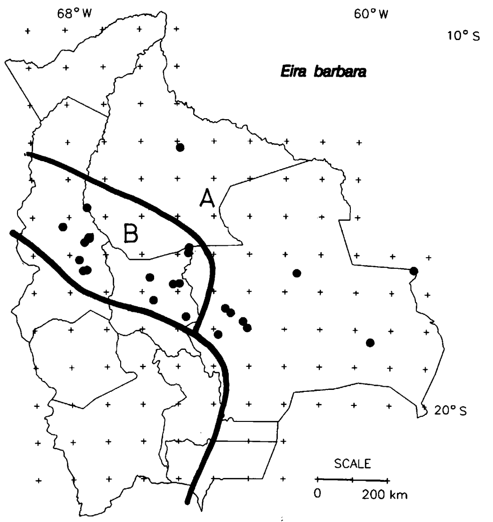


Fig. 655. Localities of known occurrence of two subspecies of *Eira barbara*, *E. b. barbara* (A) and *E. b. peruana* (B).

No Bolivian data are available on habits, behavior, food, or reproduction.

CONSERVATION STATUS: Relatively common for a carnivore.

Scientific synonyms used for Bolivian specimens are treated under subspecies below.

Eira barbara barbara
(Linnaeus), 1758

Galictis barbara: Burmeister, 1869: 454 (Santa Cruz de la Sierra, a skin and a skull).

Eira barbara barbara: Cabrera and Yepes, 1940: 144 (first use of name combination). Anderson, 1993: 32 (general distributional records). Anderson et al., 1993: 37 (vicinity of Santa Cruz de la Sierra).

Tayra barbara: Eisentraut, 1983: 106 (name in list).

Eira barbara: Cabot et al., 1986: 43 (undocumented name in list). Cameron et al, 1989: 69 (observations in western Pando, subspecies uncertain). Parker et al., 1993: 102 (reported by local people at Curuyuqui and Perforación).

LOCALITIES (10) AND SPECIMENS (38): **Beni:** 1550/6441, 5 km NW of mouth of río Grande on río Mamoré, 3 AM. **Santa Cruz:** 1622/5824, probably near San Matías, 1 FM; 1630/6140, Zapoco, 1 MNK; coordinates uncertain, Cerro Hosana, 1 CM; 1727/6340, Buenavista, 1 AM, 12 BM, 3 CM, 5 FM, 6 MACN; 1734/6331, 3 km SE of Caranda, río Palometillas, 1 MSB; 1748/6310, Santa Cruz de la Sierra, 1 MACN (Krumbiegel, 1942b: 92; photo of one skin); 1758/6303, 27 km SE of Santa Cruz, 1 MSB; 1809/6352, Samaipata, 1 ANSP; 1819/5934, Santiago de Chiquitos (Krumbiegel, 1942b).

Measurements in tables 12 and 13 are of specimens from 5 km NE of the mouth of the río Grande (AM 214735–214737) and Veinte y Dos (AM 215134–215136).

Eira barbara peruana
Nehring, 1886

Galera barbara brunnea Thomas, 1901a: 180 (type locality "Mapiri, Upper Beni River, W. [= western] Bolivia. Alt. 800 m," La Paz). Neveu-Lemaire and Grandidier, 1911, pl. 7 (cited Thomas's record).

Tayra barbara madeirensis: Osgood, 1916: 212 (Todos Santos).

Eira barbara peruana: Cabrera and Yepes, 1940: 144 (first use of name combination). Anderson, 1993: 32 (general distributional records).

Tayra barbara brunnea: Krumbiegel, 1942b: 107 (Mapiri).

Tayra barbara: Arce Pereira et al., 1963: 151 (name in list; Chipiriri).

Eira barbara: Stearman, 1990: 380 (Yuquí camp at 1647/6457).

LOCALITIES (14) AND SPECIMENS (26): **Beni:** 1310/6455, Veinte y Dos, 15 km SW of San Joaquín, 3 AM. **Cochabamba:** 1558/6442, río Chapare mouth, 1 ANSP; 1637/6547, 50 km NW of Villa Tunari, 3 UMMZ; 1647/6457, Campamento Yuqui, 1 MNLP; 1648/6508, Todos Santos, 2 AM; 1714/6541, Incachaca, 1 CM; 1740/6446, Calahuasi, 2 IML. **La Paz:** 1445/6730, río Quiquibey, 10 km from mouth, 4 CBF; 1515/6810, Mapiri, 1 BM; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 1 TTU; 1540/6735, Serranía Bella Vista, 35 km by road N of Caranavi, 2 AM; 1608/6744, Chijchipa, 1 MNLP, 2 MSB; 1624/6731, Chulumani, 1 BM; 1625/6738, province of Sud Yungas, Suiqui, 1 MNLP.

Measurements in tables 12 and 13 are of specimens from Todos Santos (AM 38810, 40838), and Serrania Bella Vista (AM 246962–246963).

Eira barbara, subspecies not determined

LOCALITIES (2) AND SPECIMENS (7): coordinates unknown, Sococha, Chascante, 1 MACN (not seen); "Bolivia" only, 1 ANSP, 2 CM, 2 MNLP, 1 MACN (not seen).

Genus *Galictis* Bell, 1826

Two living species of the genus are known. The condylobasal length of *Galictis cuja* is smaller (67.3 mm in female FM 51882, 66.5 in the female holotype, 66.6 in a female from Pilcomayo) than in *Galictis vittata* (85.4 in female from río Yapacaní, 93.3 in male from río Saguayo, 84.0 in ANSP 14272 of unknown sex and locality).

Thomas (1912c: 45) distinguished a small and a large species of grison and noted that the smaller also has no inner cusp on the lower carnassial tooth. He, somewhat equivocally, proposed the subgeneric name *Grisonella* with *G. furax* as the type species, now generally treated as a subspecies of *G. cuja*.

Galictis cuja (Molina), 1782

Lesser Grison, Juruna, Hurón Menor

TAXONOMIC REMARKS: Molina (1782: 291) named *Mustela Cuja*; type locality "Chili" restricted by Thomas (1912c: 46) to "S[outhern]. Chili (Temuco)," and by Cabrera (1958: 261) to "alrededores de Santiago."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 12 and 13 are of specimens from the río Pilcomayo (AM 38983), Comarapa (BM 34.9.2.54), Aguirre (FM 51882).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 656.

HABITAT: Known localities are above 2000 m in elevation.

No Bolivian data are available on habits, behavior, or food.

REPRODUCTION: A young individual, weight 200 g, was taken in La Paz city in May.

CONSERVATION STATUS: Do not seem to be common, otherwise little known.

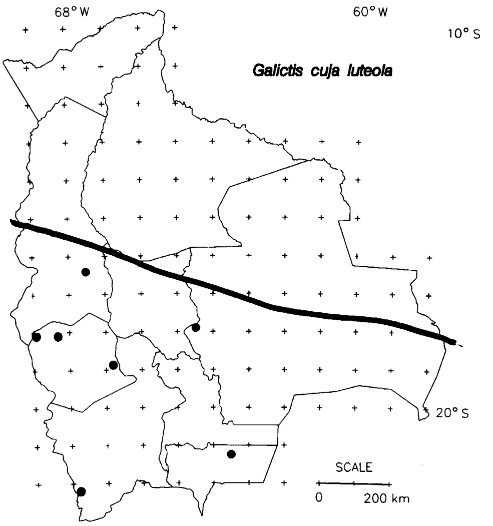


Fig. 656. Localities of known occurrence of *Galictis cuja luteola*.

Scientific synonyms used for Bolivian specimens are:

Galictis cuja luteola (Thomas), 1907

Grison furax luteolus Thomas, 1907b: 163 (type locality "Chulumani, Bolivia, 67° W., 16° S. Alt. 1800 m." in La Paz department). Neveu-Lemaire and Grandidier, 1911: 7 (Chulumani).

Galictis cuja luteola: Cabrera, 1958: 262 (cited Thomas's record). Suárez Morales, 1986: 55 (undocumented name in list). Anderson, 1993: 32 (general distributional records). Yensen and Tarifa, 1993: 53 (three from near Sajama, Campamento Khastor, and San Pablo de Lipez). Yensen et al., 1994: 409 (1806/6859, 1810/6857, Challapata, Laguna Colorada region, Turco).

Grison vittata luteola: Krumbiegel, 1942b: 102 (Chulumani).

Galictis cuja: Salazar, 1990: 188 (Campamento Khastor and San Pablo de Lipez, photographs of locally prepared taxidermy specimens). Mercado and Miralles, 1991: 295 (La Paz Valley).

LOCALITIES (10) AND SPECIMENS AND REPORTS (10): **Cochabamba:** coordinates uncertain, Aguirre, 1 FM. **La Paz:** 1624/6731, Chulumani, 1 BM. **Oruro:** 1806/6859, 4 km N of village of Sahama, 1 CBF (Yensen and Tarifa, 1993: 53); 1810/6857, 4 km SE of village of Sahama, 2 CBF (Yensen and Tarifa, 1993: 53); 1810/6813, Turco, 85 km SE

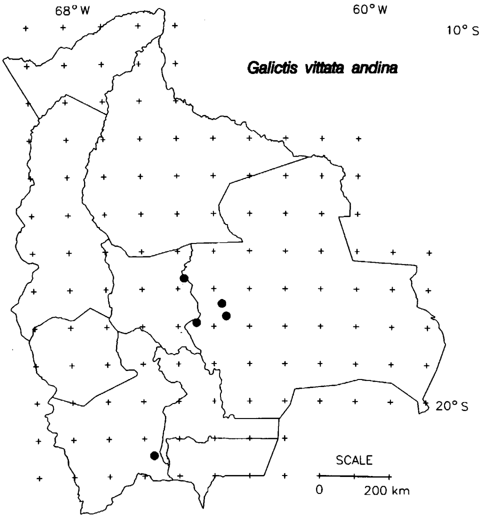


Fig. 657. Localities of known occurrence of *Galictis vittata andina.*

of Sahama, 1 (Yensen et al., 1994: 409); 1854/6647, Challapata, 1 CBF (Yensen et al., 1994: 408). **Potosí:** 2214/6659, Campamento Khastor, photo (Yensen et al., 1994: 409); 2217/6747, Laguna Colorada region, 1 CBF (Yensen et al., 1994: 409). **Santa Cruz:** 1754/6429, Comarapa, 1 BM. **Tarija:** 2115/6330, río Pilcomayo (coordinates uncertain), 1 AM.

Galictis vittata
(Schreber), 1776

Greater Grison,
Hurón Grande

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Viverra vittata* was described by Schreber (1777: 447), type locality Surinam. *Galictis andina* was described by Thomas (1903b: 462), type locality "Pozuzo, Peru." Cabrera (1958: 258) used the name *Galictis vittata andina.*

Morphological Characters and Comparisons: Measurements in tables 12 and 13 are of specimens from the río Saguayo (CM 2188), the río Yapacaní (FM 21395), and Cerro del Amboró (MACN 50.91).

Distributional Notes: Known localities are listed below and mapped in figure 657.

No Bolivian data are available on habitat, habits, behavior, food, reproduction, or conservation status.

Scientific synonyms used for Bolivian specimens are:

Galictis vittata andina
Thomas, 1903

Galictis vittata andina: Anderson, 1993: 32 (general distributional records). Anderson et al., 1993: 37 (vicinity of Santa Cruz de la Sierra).
Galictis vittata: Emmons and Feer, 1990: 143 (mentioned Bolivia).
Galictis vitatta: Ibáñez et al., 1994: 81 (first specimen from Potosí).

Localities (6) and Specimens (9): **Cochabamba:** 1643/6449, río Chimoré, 1 CBF. **Potosí:** 2127/6543, Talina Tupisa, 1 EBD. **Santa Cruz:** 1724/6346, río Yapacaní, 1 FM; 1744/6339, Cerro del Amboró, 1 MACN; 1754/6429, Comarapa, 1 BM; coordinates uncertain, río Saguayo, province of Sara, 1 CM. **Department unknown:** "Bolivia" only, 1 ANSP, 1 BM, 1 MNLP.

Genus *Mustela* Linnaeus, 1758

Three species of this largely Holarctic genus are native to South America. Only *Mustela frenata* reaches into Bolivia.

Mustela frenata
Lichtenstein, 1831

Vernacular names are Long-tailed Weasel and Mustela de Cola Larga. The subspecies that occurs in Bolivia is the southernmost of this widely ranging species.

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Mustela frenata* was described by Lichtenstein (1831: not paginated, "Das gezaumte Wiesel"), type locality "der Nahe der Mexico."

Morphological Characters and Comparisons: Measurements in tables 12 and 13 are of specimens from Ñequejahuira (AM 72587) and Corani (AM 268672).

Distributional Notes: Known localities are listed below and mapped in figure 658.

Habitat: The known localities are all in the Yungas at elevations between 2000 and 3800 m.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

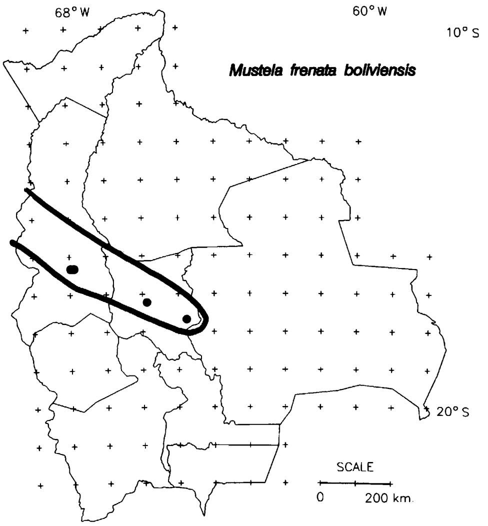


Fig. 658. Localities of known occurrence of *Mustela frenata boliviensis.*

Conservation Status: Moderately common in the restricted area where it occurs.

Scientific synonyms used for Bolivian specimens are:

Mustela frenata boliviensis Hall, 1938

Mustela: Tate, 1931a: 253 (mentioned a weasel caught by him in Bolivia).

Mustela frenata boliviensis Hall, 1938: 67 (type locality Ñequejahuira, La Paz, Bolivia); 1951: 402 (same specimen). Anderson, 1993: 31 (general distributional records). Lawrence, 1993: 159 (type locality).

Mustela frenata: Emmons and Feer, 1990: 143 (mentioned Bolivia).

Localities (5) and Specimens (6): **Cochabamba:** 1713/6552, Corani, 1 AM; 1740/6446, Carahuasi, 1 IML. **La Paz:** 1619/6752, the holotype; 1619/6753, río Aceromarca, 1 CBF; 1619/6758, Mina Lourdes, 3800 m elevation, 1 MSB. **Department unknown:** perhaps Bolivia, 1 MNLP.

FAMILY PROCYONIDAE GRAY, 1825

Four of the seven living genera of procyonids occur in Bolivia.

No Bolivian procyonid is regarded as endangered or threatened under CITES.

SUBFAMILY POTOSINAE TROUESSART, 1904

Taxonomic Remarks: Bonaparte (1850: 111) used the name Cercoleptina. *Cercoleptes* is a junior synonym of *Potos*. The Code (ICZN, 1985, Art. 40) states that "if a family-group name has been replaced before 1961 because [the generic name on which a valid family-group name is based is rejected as a junior synonym] . . ., and the replacement name has won general acceptance, it is to be maintained." Another competing name is Bassariscinae Gray (1869: 246), based on *Bassaris* of Lichtenstein (1831), a name preoccupied in Lepidoptera, renamed *Bassariscus* by Coues (1887: 516). Although none of the three names (Cercoleptinae, Bassariscinae, or Potosinae) has been widely used, I will assume that Potosinae "has won general acceptance" (e.g., Wozencraft *in* Wilson and Reeder, 1993: 333). Article 40(b)(ii) provides that in the event of divergent interpretations of the expression "general acceptance," the case is to be referred to the Commission for a decision.

Genus *Bassaricyon* Allen, 1876

Five species were recognized by Honacki et al. (1982: 252) and Wozencraft (*in* Wilson and Reeder, 1993: 333), but further revision of the genus probably will reduce the number. Only one is known to occur in Bolivia.

Bassaricyon alleni Thomas, 1880

Olingo

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Bassaricyon alleni* was described by Thomas (1880: 397), type locality "Sarayacu, on the Bobonasa river," province of Napo-Pastaza, Ecuador. *Bassaricyon gabbii* was described by Allen (1876: 21); type locality "Costa Rica" restricted by Allen (1908: 667) to "Talamanca, on the southeast coast of Costa Rica." "Several workers have suggested that the several named forms of *Bassaricyon* are conspecific . . . but supporting systematic work is lacking" (Wozencraft *in* Wilson and Reeder, 1993: 333). The use of *B. gabbii* in the Bo-

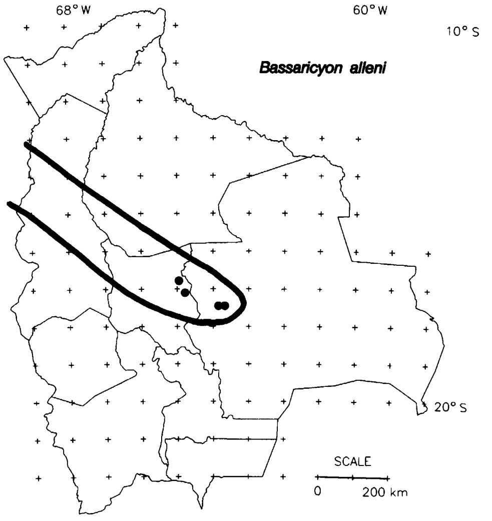


Fig. 659. Localities of known occurrence of *Bassaricyon alleni.*

livian synonymy is based on the idea of a single species.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 12 and 13 are of specimens from Campamento Yuquí (MNLP 875 = KHR 43) and Sajta (CBF 2950). One female from Campamento Yuquí weighed 1.2 kg (Redford and Stearman, 1993: 36).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 659.

HABITAT: The four known localities are in forested areas along the lower edge of the Yungas.

HABITS AND BEHAVIOR: Nocturnal and arboreal (Redford and Stearman, 1993: 36). Found in association with *Potos flavus* and *Didelphis marsupialis.*

No Bolivian data are available on food or reproduction.

CONSERVATION STATUS: The availability of only four specimens suggests its relative rarity.

Scientific synonyms used for Bolivian specimens are:

Bassaricyon alleni: Crespo, 1959: 10 (Buenavista and río Isamó). Anderson, 1993: 31 (general distributional records). Anderson et al., 1993: 37 (vicinity of Santa Cruz de la Sierra).

Bassaricyon sp: Poglayen-Neuwall and Poglayen-Neuwall, 1965: 326 (río Isamó and Buenavista).

Bassaricyon gabbii: Emmons and Feer, 1990: 140 (mentioned Bolivia). Emmons, 1991: 72 (seen at Alto río Madidi in La Paz department). Redford and Stearman, 1993: 35 (four from Campamento Yuquí).

LOCALITIES (4) AND SPECIMENS (4): **Cochabamba:** 1647/6457, Campamento Yuquí, 1 MNLP; 1706/6447, Sajta, 1 CBF. **Santa Cruz:** 1727/6340, Buenavista, 1 MACN (Crespo, 1959); 1727/6351, río Isamó, 1 MACN (Crespo, 1959).

Genus *Potos* É. Geoffroy Saint-Hilaire and F. G. Cuvier, 1795

Only one living species of *Potos* is known.

Potos flavus (Schreber), 1774

Kinkajou, Cuchumbi, Mono Gato,
Mono Michi, Tutamono

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Lemur flavus* was described by Schreber (1774: 187); original description based on animal in captivity in Jamaica, where the species is not native; type locality designated by Thomas (1902d: 267) as "Surinam." Thomas (loc. cit.) used the name *Potos flavus flavus. Potos flavus chapadensis* was described by Allen (1904a: 76), type locality "Chapada, Matto Grosso, Brazil."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 12 and 13 are of specimens from Nueva Etea (AM 262665), Buenavista (AM 94249, BM 26.12.4.33, 34.9.2.48), Isla Gargantua (MSB 57231), and locality uncertain (UM 122619). Data for Ibiato in table 12 are from W. Townsend (in litt.). Data from 29 specimens from Campamento Yuquí (Redford and Stearman, 1993: 36) included weights of males (N = 6, mean 2.7 kg, SD 0.62, range 1.8–3.6) and of females (N = 7, mean 2.3 kg, SD 0.46, range 1.6–2.9).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 660.

HABITAT: Generally forested areas in the lowlands (below 500 m) elevation.

HABITS AND BEHAVIOR: Two or more were often found together by Redford and Stearman (1993: 38).

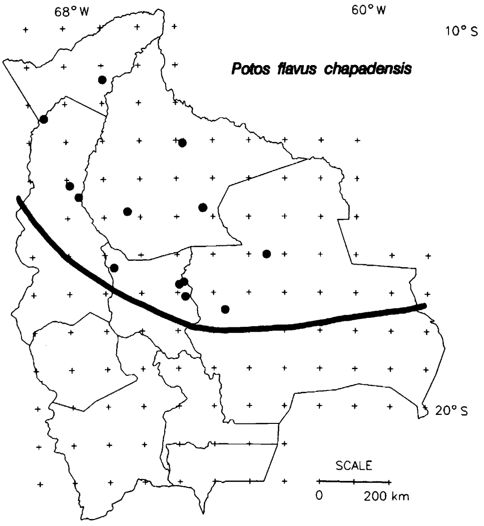


Fig. 660. Localities of known occurrence of *Potos flavus chapadensis.*

Food: Stomach contents of six individuals were reported (Redford et al., 1989; Redford and Stearman, 1993: 36). Fruit was present in three stomachs and comprised 12.5% by volume. All contained insects, 86.7% of volume, almost entirely ants.

Reproduction: A female with one embryo was taken in May.

Scientific synonyms used for Bolivian specimens are:

Potos flavus chapadensis
Allen, 1904

Cercoleptes caudivolvulus: d'Orbigny and Gervais, 1847: 18 (foot of eastern cordillera).

Potos flavus chapadensis: Crespo, 1959: 9 (Buena Vista). Ford and Hoffmann, 1988: 1 (general summary for the species). Anderson, 1993: 31 (general distributional records). Anderson et al., 1993: 37 (vicinity of Santa Cruz de la Sierra).

Potus caudivolvus: Arce Pereira et al., 1963: 151 (name in list; Chipiriri).

Potus flavus: Arce Pereira et al., 1963: 151 (name in list; Chipiriri, río Chapare).

Potos flavus: Cabot et al., 1986: 43 (undocumented name in list). Tello, 1986: 25 (Totaitu, notes on status). Cameron et al, 1989: 69 (observations in western Pando). Stearman, 1990: 380 (Yuquí camp at 1647/6457). Emmons, 1991: 72 (seen at Alto río Madidi and 13 km W of Ixiamas in La Paz department). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area).

Localities (15) and Specimens (39): **Beni:** 1304/6449, San Joaquín, 1 FM; 1448/6418, Ibiato, 1 CBF (not seen, W. Townsend, in litt.); 1451/6621, Reserva Biológica del Beni, 1 EBD; 1451/6621, El Porvenir, 1 EBD; coordinates unknown, 35 km E of Estancia Bethania, 1 FM. **Cochabamba:** 1620/6645, Yungas, 1 BM; 1643/6449, río Chimoré, 1 CBF; 1647/6457, Campamento Yuqui, 12 MNLP; 1706/6447, Sajta, 1 CBF, 1 MSB. **La Paz:** 1409/6755, Tumupasa, 1 AM; 1427/6741, 12 km W of San Buenaventura, 1 AM. **Pando:** 1122/6658, Nueva Etea, 1 AM; 1223/6835, Isla Gargantua, 1 MSB. **Santa Cruz:** 1600/6230, Totaitu, 1 MNK; 1727/6340, Buenavista, 1 AM, 2 BM, 1 FM, 3 MACN (Crespo, 1959); unknown locality, 1 UMMZ. **Department unknown:** Bolivia, 1 MACN (not seen); perhaps Bolivia, 1 BM, 3 MNLP.

SUBFAMILY PROCYONINAE GRAY, 1825

Genus *Nasua* Storr, 1780

Nasua nasua Linnaeus, 1766

Coatimundi, Coati Rojo, Tejón

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Viverra nasua* was described by Linnaeus (1766: 64), type locality Pernambuco. *N[asua] spadicea* was described by Olfers (1818: 227); type locality restricted by Hershkovitz (1959: 352) to "Paraguay." *Nasua dorsalis* was described by Gray (1866c: 169); type locality "South America" restricted, by implication only, to Peru and Ecuador by Thomas (1912d: 229). Cabrera (1958: 146) judged that all *Nasua nasua* of the upper Amazonas area represent one subspecies and used the name *Nasua nasua dorsalis*. The grouping of *Nasua* from Bolivia into the following three subspecies reflects two hypotheses rather than established relationships: (1) that there are geographic differences of sufficient magnitude and consistency to warrant the three previously recognized subspecies; and (2) that the populations in Bolivia belong to these three subspecies. Neither hypothesis has been adequately examined here or elsewhere.

Morphological Characters and Comparisons: Published data based on 60 speci-

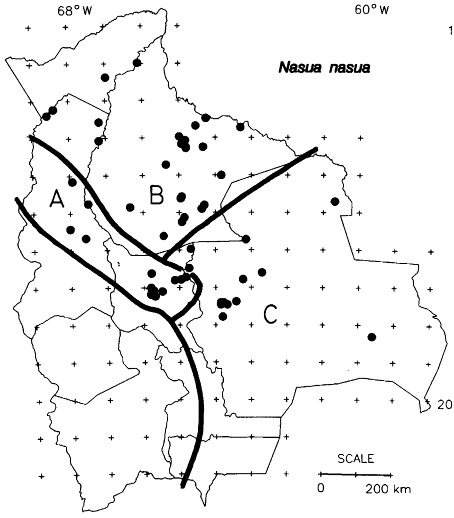


Fig. 661. Localities of known occurrence of three subspecies of *Nasua nasua*, *N. n. boliviensis* (A), *N. n. dorsalis* (B), and *N. n. spadicea* (C).

mens from Campamento Yuqui (Redford and Stearman, 1993: 38) include 12 males that had a mean weight of 04.6 kg (SD 1.3, range 1.5–6.5) and 13 females with mean weight of 4.1 kg, (SD 0.7, range 2.7–5.0).

Distributional Notes: Known localities are listed below and mapped in figure 661. Most records are from the lowlands but range up into the Yungas to at least 1650 m elevation (Serranía Bella Vista).

Habitat, habits, and behavior were discussed by Redford and Stearman (1993: 38).

Food: Redford and Stearman (1993: 38) studied stomach contents of 11 individuals. Fruit was the most common food item, making up 65.9% of the volume. Ants, beetles, and spiders were among the arthropods that made up from 5 to 95% of the contents of nine stomachs. One stomach contained a small rodent.

Reproduction: Data on three females of *N. n. dorsalis* are available; two were lactating in March and one had two embryos in September.

Scientific synonyms used for Bolivian specimens are in subspecies accounts below.

Nasua nasua boliviensis
Cabrera, 1956

Nasua nasua boliviensis Cabrera, 1956: 3 (type locality "Palmar, provincia de Chapare, departmento de Cochabamba, Bolivia, a 1.500 m de altitud"); 1958: 245 ("Yungas"). Suárez Morales, 1986: 40 (undocumented name in list). Donoso et al., 1992: 20 (observed in Serranía Bellavista). Anderson, 1993: 31 (general distributional records).

Nasua solitaria: Arce Pereira et al., 1963: 151 (name in list; Todos Santos).

Nasua nasua: Arce Pereira et al., 1963: 151 (name in list; Todos Santos). Stearman, 1990: 380 (Yuqui camp at 1647/6457). Redford and Stearman, 1993: 35 (mention 60 specimens from Campamento Yuqui). Stearman and Redford, 1995: 30 (Campamento Yuqui).

Localities (15) and Specimens (31): **Cochabamba:** 1637/6547, 50 km NW of Villa Tunari, 1 UMMZ; 1643/6449, río Chimoré, 6 CBF; 1648/6457, Campamento Yuqui, 8 MNLP; 1648/6508, Todos Santos, 1 AM; 1700/6550, Yungas, 1 AM; 1705/6543, Valle de Pampatambo, 3 EBD; 1706/6529, Palmar, 1 MACN (holotype; Cabrera, 1956); 1706/6547, Yunga San José, 1 CM; 1711/6548, Locotal, 1 AM; 1711/6548, Chapare, antes de Aduana, 1 EBD; 1714/6541, Incachaca, 2 BM. **La Paz:** 1409/6755, Tumupasa, 1 AM; 1525/6800, Chimate, 1 BM; 1540/6735, Serranía Bella Vista, 35 km by road N of Caranavi, 1 AM; coordinates uncertain, Chiniri, 2 ANSP.

Measurements in tables 12 and 13 are of specimens from the Yungas of Cochabamba (AM 38801), Todos Santos (AM 38803), Serranía Bella Vista (AM 246973) and the Yungas of San José (CM 5267).

Nasua nasua dorsalis
Gray, 1866

Nasua nasua dorsalis: Anderson, 1993: 31 (general distributional records).

Nasua nasua: Cabot et al., 1986: 43 (undocumented name in list). Cameron et al, 1989: 69 (observations in western Pando). Ergueta and Salazar, 1991: 25 (general summary). Emmons, 1991: 72 (seen at Alto río Madidi in La Paz department). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area).

Localities (30) and Specimens (210): **Beni:** 1059/6606, Riberalta, 1 US; 1229/6415, río Iténez, about 4 km above Costa Marquez [Brazil], 1 AM; 1241/6432, río Machupo, 5 km above Horquilla, 1 AM; 1244/6318, Versalles, 1 AM; 1258/6459, Azunta, 1 FM; 1304/6449, San Joaquín, 1 FM; 1304/6711, río Beni, 1 AM; 1305/6453, Aserradero Monte de San Pablo, 1 MNK; 1310/6455, Veinte y Dos, 1 AM; 1315/6420, Piedras Blancas, 5 MNK; 1315/6448, Yutiole, 12 AM; 1317/6448, 2 km E of Yuatre, 3 FM; 1343/6521, Puerto Caballo, 2 AM; 1400/6350, Los Totumu, 1 MNK; 1448/6418, Ibiato, 59 CBF, 60 MNK (+ 36 not seen, W. Townsend, in litt.); 1434/6455, 23 km W of San Javier, 2 AM; 1437/6457, río Ibare at mouth, 3 AM; 1451/6621, El Porvenir, 1 EBD; 1451/6621, Reserva Biológica del Beni, 2 EBD; 1451/6621, Totaisal, 1 EBD; 1454/6422, 6 km W of Casarabe, 2 AM; 1508/6451, 10 km E of San Antonio, 3 AM; 1515/6455, 15 km W of Loreto, 1 AM; coordinates uncertain, Centenela, 1 FM; 1536/6523, 15 km down river from Puerto San Lorenzo on the río Sécure, 1 CBF. **La Paz:** 1234/6710, Santa Ana de Madidi, 1 CBF; 1445/6730, río Quiquibey, 1 MNLP. **Pando:** 1122/6658, Nueva Etea, 1 MSB; 1213/6824, Santa Rosa, 2 CBF; 1223/6835, Chivé, 1 MNLP.

Measurements in tables 12 and 13 are of specimens from the río Machupo (AM 209131), Veinte y Dos (AM 215133), Estancia Yutiole (AM 215132), Puerto Caballo (AM 214717–214718), 23 km W of San Javier (AM 214722–214723), mouth of the río Ibare (AM 214714–214716), 6 km W of Casarabe (AM 255871), 10 km E of San Antonio (AM 214719–214720), and Versalles (AM 209129). Data for Ibiato in table 12 are from W. Townsend (in litt.).

Nasua nasua spadicea
Olfers, 1818

Nasua rufa: Eisentraut, 1933: 55 (reported from the vicinity of Villa Montes in Tarija, no specimen).

Nasua nasua aricana: Cabrera, 1958: 245 (eastern Bolivia in Santa Cruz).

Nasua nasua spadicea: Anderson, 1993: 31 (general distributional records). Anderson et al., 1993: 37 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (13) AND SPECIMENS (37): **Cochabamba:** 1558/6441, mouth of the río Chapare, 2 ANSP. **Santa Cruz:** 1442/6041, 60 km on road E of Aserradero Moira, 1 EBD; 1543/6309, 6 km by road W of Ascención, 1 AM; 1629/6444, río Ichilo, 54 km S of mouth of río Chapare, 1 AM; 1636/6242, 10 km N of San Ramón, 1 MSB; 1647/6314, Estancia Cachuela Esperanza, 1 AM; 1722/6325, province of Sara, 1 BM; 1724/6346, río Yapacaní, 4 FM, 1 MACN (not seen); 1724/6351, río Surutú, 3 CM; 1727/6340, Buenavista, 2 ANSP, 3 BM, 1 CM, 1 FM, 8 MACN (not seen); 1727/6351, río Isamó, 1 MACN (not examined); 1747/6348, 4 km S and 13 km W of San Rafael de Amboró, 1 AM; 1818/5936, 4 km N and 1 km W of Santiago de Chiquitos, 4 AM.

Measurements in table 13 are of a specimen from the río Ichilo, 54 km S of the mouth of the río Chapare (AM 214712).

Nasua nasua,
subspecies not determined

Specimens, 16, from unknown localities: "Bolivia" only, 1 ANSP, 3 BM, 6 MNLP, 6 MACN (not seen).

Genus *Procyon* Storr, 1780

Procyon cancrivorus
(Brongniart), 1792

Crab-eating Raccoon, Mayuato,
Osito Lavador

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia; *V[iverra] Cancrivora* was described by Brongniart (1792: 115), type locality "se trouve a Cayenne," or Cayenne in French Guiana; see Hershkovitz (1959a: 352) for use of Brongniart's name.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 12 and 13 are of specimens from Buenavista (AM 94246–94247) and Estancia Yutiole (AM 215129).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 662.

HABITAT: Known localities are all in the lowlands (below 500 m elevation.

No Bolivian data are available on habits, behavior, or food.

REPRODUCTION: The only note is of a lactating female in August.

CONSERVATION STATUS: Probably relatively common in suitable habitats.

Scientific synonyms used for Bolivian specimens are:

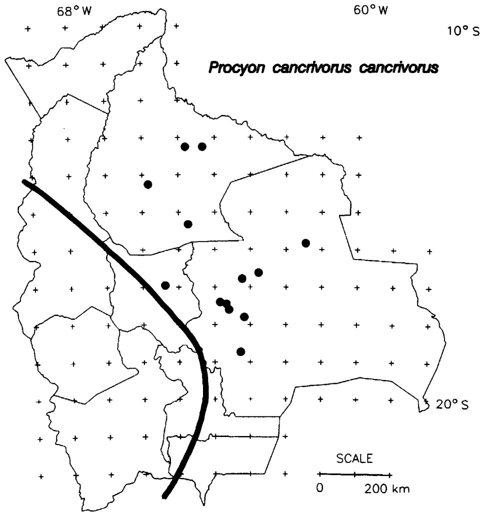


Fig. 662. Localities of known occurrence of *Procyon cancrivorus cancrivorus*.

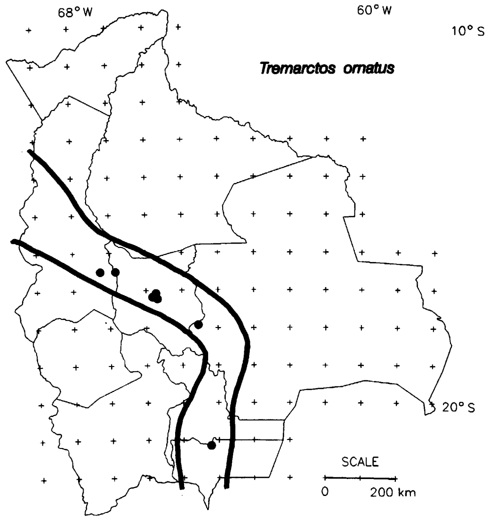


Fig. 663. Localities of known occurrence of *Tremarctos ornatus*.

Procyon cancrivorus cancrivorus (Brongniart), 1792

Procyon cancrivorus cancrivorus: Tate, 1939: 201 (Buena Vista). Crespo, 1974: 14 (Buenavista). Anderson et al., 1993: 36 (vicinity of Santa Cruz de la Sierra).

Procyon cancrivorus: Cabot et al., 1986: 43 (undocumented name in list). Anderson, 1993: 31 (general distributional records). Ibáñez et al., 1994: 81 (first specimen from Cochabamba).

Procyon cancrivorus nigripes: Hershkovitz, 1987b: 74 (Chiquitos).

LOCALITIES (13) AND SPECIMENS (30): **Beni:** 1315/6420, Piedras Blancas, 1 MNK; 1315/6448, Yutiole, 2 AM; 1415/6550, Venecia, 1 EBD; 1519/6444, Camiaco, 1 AM. **Cochabamba:** 1657/6523, Balneario Las Pozas, 1 EBD. **Santa Cruz:** 1550/6127, Santa Rosa de la Roca, 1 MSB, not seen; 1637/6246, río Quiser, 2 CM (not seen); 1647/6314, Estancia Cachuela Esperanza, 1 MSB; 1724/6351, río Surutú, 1 MACN (not seen); 1727/6340, Buenavista, 2 AM, 3 BM (2 not seen), 3 FM, 4 MACN (1 seen; Crespo reported 2 in 1974, not seen); 1736/6336, San Rafael de Amboró, 1 AM; 1748/6310, Santa Cruz (assumed to be the city), 1 MACN (not examained); 1844/6316, Curiche, 1 CM (not seen). **Department unknown:** Bolivia, 4 MACN (not seen).

FAMILY URSIDAE FISCHER, 1817

Genus *Tremarctos* Gervais, 1855

The genus includes only one species.

Tremarctos ornatus (F. G. Cuvier, 1825)

Spectacled Bear, Oso Andino, Oso de Anteojos, Jucumari

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Ursus ornatus* was described by F. G. Cuvier (1825, text of pl. 218); type locality "cordilieres du Chili" restricted to "las montañas al este de Trujillo, departamento de la Libertad, Perú" by Cabrera (1958: 242).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in table 12 are estimates; those in table 13 are of specimens from Incachaca (BM 34.9.2.70), San Josecito (MACN 17830), and Lagunillas (US 271418).

DISTRIBUTIONAL NOTES: No record for Potosí was included in the summary of Salazar and Anderson (1990), but Chacón (1892: 205) had reported the jucumari in the valleys of the province of Charcas. Known localities are listed below and mapped in figure 663.

HABITAT: Forested areas in the Yungas.

No Bolivian data are available on habits, behavior, food, or reproduction.

CONSERVATION STATUS: Considered to be an endangered species (CITES, Appendix I).

Scientific synonyms used for Bolivian specimens are:

Ursus ornatus: d'Orbigny and Gervais, 1847: 18 ("provinces de Yungas, de Sicasica, de Cochabamba et de Chuquisaca," where it is rare).

Tremarctos ornatus: Neveu-Lemaire and Grandidier, 1911: 6 ("toutes les montagnes de la Bolivie"), Cabrera, 1958: 242 (western Bolivia, 3000 m elevation). Jungius, 1974: 378 (forested zone along east slope of cordillera oriental). Tello, 1986: 24 (notes on status). Suárez Morales, 1986: 39 (undocumented name in list). Hershkovitz, 1987b: 74 (citing d'Orbigny and Gervais, 1847; Cochabamba, Chuquisaca). Eisenberg, 1989: 267 (mentioned Bolivia). Salazar Bravo and Anderson, 1990: 4 (map of Bolivian records). Ergueta and Salazar, 1991: 24 (general summary). Anderson, 1993: 31 (general distributional records). Anderson et al., 1993: 36 (vicinity of Santa Cruz de la Sierra). Ibáñez et al., 1994: 81 (first specimen from Santa Cruz).

Tremarctos ornatus ornatus: Krumbiegel, 1940c: 302 (Illimani and Chungamoytal).

LOCALITIES (9) AND SPECIMENS (19): **Cochabamba:** 1630/6650, San Antonio, río Cotacajes, 1 CBF; 1705/6543, Valle de Pampatambo, 1 EBD; 1711/6548, carretera to Chapare, 1 EBD; 1711/6549, Chapare (region), 1 MACN; 1714/6541, Incachaca, 2 BM; exact locality uncertain, Chapare, 1 MACN; exact locality uncertain, near Lagunillas and Tocorani, 4 US. **La Paz:** 1630/6715, Santiago, Sud Yungas, 2 MNLP. **Santa Cruz:** 1755/6433, Siberia, Charo Negro, [11 km by road NW of Comarapa], 1 EBD; exact locality unknown, photographs of tracks (Burmingham University). **Tarija:** 2109/6413, San Josecito, O'Conner Province, 2 MACN. **Department uncertain:** Bolivia only, 2 MACN (not seen); perhaps Bolivia, 1 MNLP.

ORDER ODONTOCETI FLOWER, 1867

FAMILY PLATANISTIDAE GRAY, 1846

Genus *Inia* d'Orbigny, 1834

Inia geoffrensis (Blainville *in* Desmarest), 1817

Bolivia. *Delphinus geoffrensis* was described by Blainville (*in* Desmarest, 1817: 151), type locality "sur la cote du Bresil," probably upper Amazon River. The synonymy summarizes the history of taxonomic usage for the Bolivian population of *Inia*. It has been treated as a distinct species, as a subspecies of the Amazonian species, and as a synonym of the Amazonian species. In a study on the South American freshwater dolphin *Inia geoffrensis*, van Bree and Robineau (1974) recognized *boliviensis* d'Orbigny, 1834, as a distinct subspecies living in the tributaries of the río Madeira above Abuna (9°41'S and 65°20'W). As compared to the nominate subspecies, the Bolivian *Inia* have more teeth in each tooth row, more slender teeth, and differently shaped nasals. Unfortunately, van Bree and Robineau were unaware of six *Inia* at the American Museum of Natural History that had been obtained in Bolivia in 1964. Data on these six specimens, summarized here, add to existing knowledge and strengthen the conclusion of van Bree and Robineau that *Inia geoffrensis boliviensis* is a distinct subspecies.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: A series of papers on morphology based on four specimens obtained by Pilleri in the río Ibare west of Trinidad in the Beni are noted in the synonymy. I acquired six specimens near Costa Marques, Brazil (12°28'S, 64°18'W) on the río Iténez or Guaporé. These were 209101 and 209102 from the río Iténez, which is the international boundary, 5 September; 209103 (fig. 664) from about 4 km above Costa Marques, 10 September; 209104 from 2 km above Costa Marques, 20 September; and 209105, 29 September, and 209106, 7 October, from the mouth of the río Baures about 5 km below (downstream from) Costa Marques. All are labeled as from Bolivia, department of Beni.

A number of external measurements were taken and are recorded in table 14. Length measurements are the least distances between planes through the reference points mentioned and perpendicular to the long axis of the animal. The measurements, therefore, are not

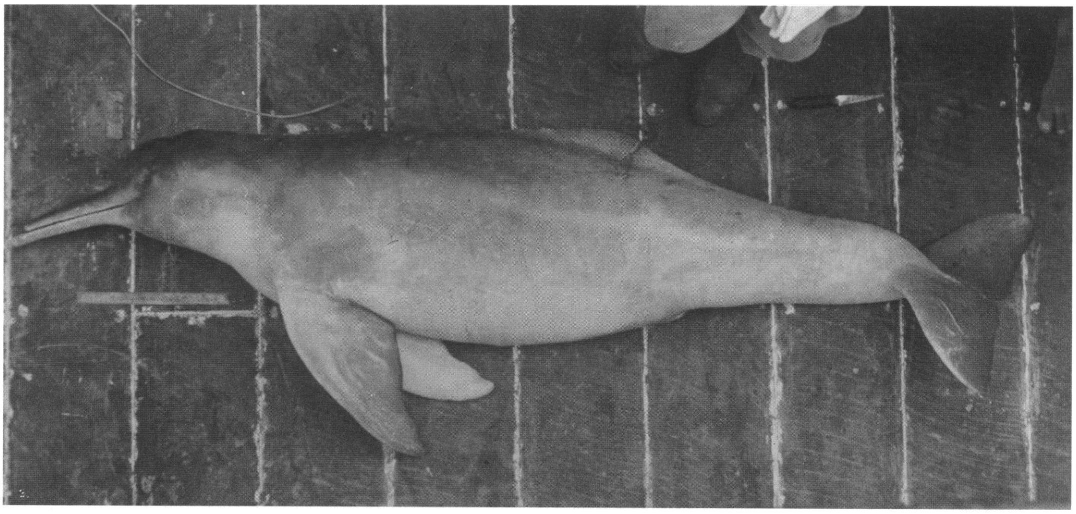


Fig. 664. *Inia geoffrensis* (AMNH 209103) from the río Iténez, 4 km above Costa Marques, Brazil (1229/6415), ca. elevation 200 m.

ternal measurements of two Bolivian specimens were published by Pilleri (1977b: 35).

Cranial measurements of four Bolivian specimens were published by Pilleri (1977b: 36); those for seven other Bolivian specimens were published by Casinos and Ocana (1979: 197). Additional cranial measurements are in table 15.

American Museum of Natural History (AM) catalog number 209101. Weights of organs in kilograms were stomach and contents, 2.5; intestine, mesenteries, and contents, 2.5; liver and part of diaphragm, 1.7; kidneys, 0.3; right lung, 1.2; left lung, 0.9; heart, 0.35; testes, 0.4. Number of mandibular hairs was 14, maxillary hairs was 10. The length of the gut was 30 m.

Specimen AM 209102. Weights of organs in kilograms were: stomach and contents, 1.2; intestines, mesenteries, and contents, 1.9; liver and part of diaphragm, 1.2; kidneys, 0.3; lungs, 1.1; heart, 0.35. Length of gut was 28 m.

Specimen AM 209103. There were 35 mandibular hairs. Temperatures recorded about ten to fifteen minutes after the animal was harpooned were rectal 35.6°C, in dorsal muscle mass 36.5°C, of water in river 29.3°C. Length measurements are from the tip of the lower jaw, for the upper jaw was abnormally shortened. The uterus contained no embryo but was enlarged and well supplied with blood vessels.

Specimen AM 209104. A partial skeleton found on the river bank, lacks external measurements, and is of unknown sex.

Specimen AM 209105. Harpooned while feeding on fish, disabled by rotenone used for collecting fish.

Specimen AM 209106. Harpooned and then brought back alive to the laboratory in a canoe. Kept wet. Temperature (rectal) immediately after death from chloroform was 37.3°C. The uterus was small.

Distributional Notes: Iténez is the Bolivian name for the river called Guaporé in Brazil. Known localities are listed below and mapped in figure 665.

In 1975, Dr. Peter J. H. van Bree and the author prepared most of the following notes on Bolivian *Inia*, which were not published at that time. Field parties from the American Museum of Natural History worked in northeastern Bolivia in 1964 and 1965, traveling principally by boat. In 1964, the río Mamoré was traversed along the Brazilian border from Guayaramerin to the mouth of the río Iténez or Guaporé, and this river was traversed to the mouth of the río Paragua. Also in 1964, some side trips in canoes were made on the Machupo and Baures rivers. In 1965, the río Mamoré was traversed from Guayaramarin to

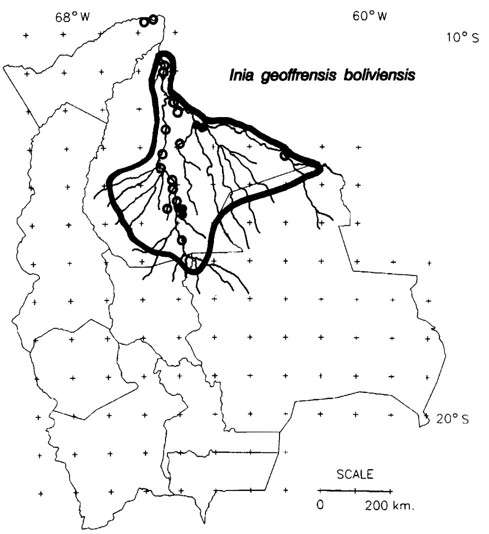


Fig. 665. Localities of known occurrence of *Inia geoffrensis boliviensis* and *Inia geoffrensis geoffrensis* (two northernmost sightings). Dots are for specimens and circles are for sightings mentioned in text.

the río Ichilo, and this river was traversed to near the mouth of the río Chimoré, although the latter river was not reached.

Six specimens of *Inia* were acquired and prepared by Anderson. One of these dolphins (AM 209104) was a partial skeleton picked up on the riverbank, but the others were obtained with small harpoons by hunters in dugout canoes. These five were fresh and intact, and measurements were obtained as noted above.

Dr. Karl F. Koopman recorded the following observations of *Inia*: On 8 July 1964 at Santa Rosa (11°44'S, 65°16'W), an *Inia* surfaced repeatedly quite close to the boat. On 9 July 1964, several dolphins and tremendous numbers of cormorants were seen near the mouth of the río Iténez (11°54'S, 65°04'W). On 28 July 1964, northwest of Larangeiras (13°18'S, 61°59'W), several *Inia* were seen. On 16 August 1964, a dead dolphin was seen on the bank of the río Machupo downriver from San Joaquín (which is at 13°05'S, 64°48'W). On 6 August 1965, several dolphins were seen about the boat on the río Mamoré at 5 km southeast of the onetime settlement of Limoquije (15°28'S, 64°46'W).

Anderson (fieldnotes of 3 September 1965) recorded the presence of "many *Inia*" at the mouth of the río Ibare (14°37'S, 64°56'W). Near the mouth of the río Baures, two dolphins were briefly observed adjacent to each other, in water so shallow that flippers protruded, engaged in strenuous activity, perhaps copulation (S. Anderson, 29 September 1964). Attention was drawn in this case by the noise of splashing water. The observers were checking a mist-net south of the river. The animals returned to deeper water when observers appeared on the bank about 100 m from them.

Dr. Richard G. Van Gelder recorded the following observations of *Inia*: On 7 May 1965, two were seen about 3 km upstream from Guajaramerin (10°50'S, 65°25'W). On 8 May, another one was seen at the Siete Islas (11°00'S, 65°15'W), 8 km north of Santa Cruz. On 11 May, three or four *Inia* were seen and heard blowing all afternoon and evening in the mouth of the Arroyo Mercedes (11°30'S, 65°07'W), 6 km south of Buena Hora, Brazil. They were also heard during rain in the night. On 12 May in the Arroyo Mercedes in the hour from 0700 to 0800, at least five were in sight-range most of the time. Audible blows were heard at about each 10 to 12 seconds, but one swimming at the surface blew three times at three-second intervals. In about one of each 20 blows, the beak was exposed. Two *Inia* were together at one side of a bed of aquatic vegetation and three were together at the other side. On 16 May, bufeos were seen most of the day and heard at night, 7 km northwest of Alejandria (12°04'S, 65°08'W). On 20 May, many were seen at the mouth of the río Mayosos at 1445 (12°30'S, 65°15'W). On 21 May, about 10 to 12 were seen in the río Matucare within 2 km of its mouth near Puerto Siles (12°52'S, 65°04'W). On 22 May, Van Gelder watched a bufeo swimming in front of the houseboat proceeding upstream above Puerto Siles at about 2 knots against the current. The dolphin surfaced to breathe at intervals of 30, 30, 35, 35, 45, 45, and 50 seconds. More were seen in the afternoon before reaching a point 22 km south of Puerto Siles. On 25 May, they were abundant before reaching a point 7 km south of Exaltación (13°15'S, 65°17'W). On 27 May, a fair number were seen in the río Yacuma within 2 km of its mouth (13°37′S, 65°20′W). On 4 June, their presence was noted at latitude 13°50′S in the río Mamoré and on 5 June at 14°00′S. On 5 June and on 7 June, many were seen in the río Tijamuchi within 4 km of its mouth (at latitude 14°09′S).

Dr. Reeve M. Bailey, who was present when three of our specimens were captured, wrote (in litt. of 15 July 1974) that the bufeos in the río Iténez near Costa Marquez were wary and difficult to approach during the course of the ichthyological work, until after a shipment of rotenone was received. Then the dolphins, often in numbers, came into the area where fish collecting was in progress. At such times, the dolphins seemed preoccupied with catching the fish rendered moribund by the rotenone, and they would frequently surface within a few feet of the canoe. More could have been harpooned had more specimens been desired. The use of rotenone can thus expedite the collecting of *Inia*. Bailey judged that a cast net might have been used to catch specimens alive.

The above observations in the fieldnotes of Koopman, Anderson, Van Gelder, and Bailey, and the specimens noted below, although recorded incidentally in a general itinerary of the expedition, suffice to document the wide distribution of the bufeo, *Inia geoffrensis*, in certain rivers of the department of Beni in northeastern Bolivia.

Based on memory (in addition to notes made at the time), it is clear that bufeos were seen much more frequently than recorded. The descriptions of behavior given by Pilleri (1969a, 1969b) agree with recalled observations in regard to diving postures; tendency of dolphins, perhaps the same individuals, to remain in one area of the river for many days (observed at Costa Marques); and their occurrence as scattered individuals or small groups rather than in larger schools. No epimeletic or helping behavior was observed. When harpooned, the animals made a fast, strong dash, but tired in a very few minutes. They could then be loaded into the canoe and returned alive to camp with little thrashing about. Some of the local people at Costa Marques, both Brazilians and Bolivians (who had fled the fever epidemic in San Joaquín), said that they had heard that the flesh of the bufeo was not edible or was poisonous. The expedition cook was instructed to prepare some of the dark red flesh and several members of the party found it quite satisfactory as food; however, persistence of the taboo would be to the benefit of the bufeos.

In August 1985, we observed bufeos in the río Tijamuchi at latitude 14°56′S and longitude 63°09′W, where the main east-west road crosses the river. Later in 1985, we traversed the río Beni by boat from Rurrenabaque down to Riberalta and also went a few kilometers up the río Madidi to Santa Ana de Madidi. In 1986, we traversed the río Madre de Dios from its mouth up to the Peruvian border. At no time did we see or hear bufeos. There are no specimen records from the Beni-Madre de Dios river system and the local people never mentioned them to us. Presumably, then, bufeos do not occur above the cachuelas [= rapids] on the río Beni between Riberalta and Abuna.

Pilleri (1977b: 35) noted that Dr. R. Blattmann of La Paz reported having seen bufeos in the wintertime near ("etwa auf der Hohe von") Puerto Salinas (Reyes) on the río Beni. Only a few kilometers east of Reyes are streams in the headwaters of the Mamoré drainage that may be inhabited by *Inia*. Another reference to the río Beni is that of Tello (1986: 22), who noted that bufeos were "reported as abundant all along the Mamoré, Ichilo, Apere, and Beni rivers." Nevertheless, until we have firsthand observations (preferably with good photographs or specimens), the occurrence of the species in the río Beni or its tributaries is dubious.

José Lobao Tello (1986: 22) recorded the following observations: "Twenty eight were seen about 20 km off the Ibare river (affluent of the Mamoré) in the vicinity of Trinidad; 20 were recorded between Concepción and Los Totumus, in the Itonamas river; 3 were encountered in a small branch of the Mamoré river, near the Porto Almacen (Trinidad) and they were always seen when I crossed the Mamoré river, near Trinidad."

Inia were observed in the río Abuna (0947/6532) and the río Negro (0952/6542) in Pando (Emmons and Smith, 1992). These rivers empty into the Madeira below the cachuelas between Abuna and Riberalta. When specimens can be obtained, they may prove to be of the the nominate subspecies *Inia* *geoffrensis geoffrensis* and would provide the first record for this subspecies in Bolivia. Furthermore, it is possible that *boliviensis* and *geoffrensis* are specifically distinct, presenting a taxonomic question that needs further study.

Emmons and Smith also listed Ingavi, but this was a mistake (L. Emmons, personal commun.). Ingavi is on the río Orthon, which empties into the Mamoré above the cachuelas, and a definite record here would be the first for anywhere in the Beni-Madre de Dios system.

PARASITISM: On 10 May, a small (180-mm), blue-gray fish was caught 5 km south of Buena Hora, Brazil. The Bolivians said that this type of fish always associates with *Inia* and sucks its blood. The fish bears field number 2739 of Alfredo Ximenez and was identified as *Cetopsis* by G. S. Myers. The stomach was opened in August 1974 and the liquid contents sampled and examined with a microscope. Squamous epithelial cells (perhaps from the cut made into the fish) and other cellular debris were seen but nothing resembling mammalian erythrocytes. *Cetopsis* is known in one case to have attempted to rasp the skin on the leg of a person. This report and other evidence on blood- and tissue-eating parasitic catfish (currently regarded as Cetopsidae and Trichomycteridae, then referred to Pygidiidae) were summarized by Kelley and Atz (1964; see also Roberts, 1972, for notes on the Amazonian catfishes known as candiru). Whether the cetopsids suck blood is an unanswered question.

REPRODUCTION: No data.

CONSERVATION STATUS: Regarded as threatened under CITES Appendix II.

Scientific synonyms used for Bolivian specimens are:

Inia geoffrensis boliviensis
d'Orbigny, 1834

Inia boliviensis d'Orbigny, 1834: 22, pl. 3 (type locality Rio Guapore, at Principe da Beira, Brazil). d'Orbigny and Gervais, 1847: 30 and pl. 22. Pilleri, 1977b: 34 (nos. 672–676, ríos Mamoré and Upurupuru). Pilleri and Gihr, 1977: 11 (summary of d'Orbigny's work in Bolivia). Pilleri and Gihr, 1980: 11 (critical review of taxonomy, photos in color and black and white of Bolivian specimens). Nowak and Paradiso, 1983: 864. Grabert, 1984a: 365; 1984b: 335.

Inia Geoffrensis: Gervais, 1855: 89 (synonymized *I. boliviensis* with *I. geoffrensis*).

Inia amazonica: Pelzeln, 1883: 94 (río Guapore abaixo da Lanterna).

Inia geoffroyensis: Vieira, 1955: 439 ["Bolivia (rios Madeira, Beni e Guapore)" but, as noted above, there is no convincing record of the species in the río Beni].

Inia geoffrensis: Pilleri and Gihr, 1968: 933 (brain photos, four specimens from near Puerto Almacen). Pilleri, 1969a: 64 (near Puerto Almacen; photos of habitat, intact animal, brain). Pilleri, 1969b (near Puerto Almacen; behavior, detailed fieldnotes, table of measurements of specimens 417 to 420, fish and crabs as food). Pilleri and Gihr, 1969a (brain weights, photo of brain of no. 419). Pilleri and Gihr, 1969b (anatomy and pathology, photos and measurements of four Beni specimens, nos. 417–420). Gruenberger, 1970: 131 (cerebral anatomy; specimens 417–420 from at or near the río Ibare). Gihr and Kraus, 1970: 170 (measurements, photos of kidneys, río Ibare). De Monte and Pilleri, 1970 (composition of urine, río Ibare); 1971 (plasmaproteins). Dailly, 1971 (anatomy of cochlear nuclei; same four specimens from río Ibare). Pilleri, 1972 (eat fish and crabs). Casinos and Ocana, 1979 (craniometry, included seven Bolivian specimens). Emmons and Feer, 1990: 154 (mentioned "upper Madeira drainage in Beni, Bolivia," incorrectly mapped in the Beni River drainage rather than in the Mamoré and Iténez rivers farther east, where it does occur). Ergueta and Salazar, 1991: 42 (general summary). Emmons and Smith, 1992 (unpublished list for Pando). Vargas and Méndez *in* Altamirano, 1992 (reported from Isiboro-Sécure area).

Inia geoffrensis boliviensis: van Bree and Robineau, 1973: 660 and pl. XX (figures of skull of holotype). Suárez Morales, 1986: 41 (undocumented name in list and undocumented mention of *Sotalia pluvialis*, for which there is no Bolivian record). Best and da Silva, 1993: 1 (general biology of the species; in fig. 2 mistakenly implies presence in Beni river system and, for the subspecies, in Brazil near the border). Anderson, 1993: 45 (general distributional records).

Inia geofrensis: Tello, 1986: 22 (observed in various rivers).

LOCALITIES (12) AND SPECIMENS (18): **Beni:** 1225/6427, río Guaporé, at Principe da Beira [Brazil], 1 Paris (holotype); 1229/6415, río Iténez, 4 km above Costa Marques [Brazil], 1 AM; 1229/6417, río Iténez, opposite Costa Marques, 2 AM; 1230/6418, boca del río Baures, 2 AM; 1347/6438, río Ipurupuru, Trinidad (nos. 675–676; Pilleri, 1977b: 36); 1437/6451, Puerto Almacen, Lagoon, Toribio Canal, 1 (no. 419, Pilleri and Gihr, 1968); 1437/6457, río Ibare, 1 (no. 417; loc. cit.); 1437/6457, río Ibare, Alpiri House, 1 (no. 418; loc. cit.); 1447/6451, Toribio Canal to río Mamoré, 1 (no. 420; loc. cit.); 1447/6451, río Mamoré (no. 672; Pilleri, 1977b: 36); 1447/6451, río Mamoré, Estancia La Habana (nos. 673–674; Pilleri, 1977b: 36); coordinates uncertain, rio Guaporé abaixo da Lanterna, 1 (Pelzeln, 1883); coordinates uncertain, río Mamoré, 1 Colegio San Calixto, La Paz (Casinos and Ocana, 1979), now in MNLP; "Beni" only, 1 Casa de la Cultura, Santa Cruz (loc. cit.).

ORDER PERISSODACTYLA OWEN, 1848

Families and taxa of lower categories are arranged alphabetically, not phylogenetically.

FAMILY EQUIDAE GRAY, 1821

Equidae, once common in the American continents, had become extinct long before humans entered these continents. For records of some Bolivian fossil equids, see Boule and Thevenin (1920).

Genus *Equus* Linnaeus, 1758

Equus asinus Linnaeus, 1758

Ass, Donkey, Burro

I do not know if there are any feral Bolivian populations of this domestic species.

Scientific names relevant for Bolivia are:

Equus Asinus Linnaeus, 1758: 73 (type locality given as "in oriente"). Neveu-Lemaire and Grandidier, 1911: 112 (discussed domestic donkeys in Bolivia).

Equus asinus: Mercado and Miralles, 1991: 295 (La Paz Valley).

Eqqus asinus: Miralles and Salazar, "1990": 12 (misspelling in list).

LOCALITIES (1) AND SPECIMENS (2): **Tarija:** 2147/6440, 11.5 km N and 5.5 km E of Padcaya, 2 CBF.

Equus caballus Linnaeus, 1758

Horse or Caballo

I do not know if there are any feral Bolivian populations of this domestic species.

Scientific names relevant for Bolivia are:

Equus Caballus Linnaeus, 1758: 73 (type locality "Europa"). Neveu-Lemaire and Grandidier, 1911: 111 (discussed the horse in Bolivia).

Equus caballus: Mercado and Miralles, 1991: 295 (La Paz Valley).

Eqqus eqqus: Miralles and Salazar, "1990": 12 (misspelling in list).

Specimens, 1. **Tarija:** 2138/6234, Estancia Bolivar, 1 CBF.

FAMILY TAPIRIDAE GRAY, 1821

Genus *Tapirus* Brünnich, 1771

Tapirus terrestris (Linnaeus), 1758

Tapir, Anta, Tapir de las Llanuras, Yomomo

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Hippopotamus terrestris* was described by Linnaeus (1758: 74); type locality "Brasilia" restricted by Thomas (1911c: 155) to Pernambuco. *Tapirus spegazzinii* was described by Ameghino (1909: 31), type locality río Pescado, department of Oran in the province of Salta, Argentina. Lydekker (1916: 43) first used the name combination *Tapirus terrestris spegazzinii*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements are condylobasal, 357.7 mm; palatilar, 184.4; and zygomatic, 183.8 for a young adult from Campamento 08 (MNLP 626).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 666.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

CONSERVATION STATUS: Regarded as threatened (CITES, Appendix II). Hunted wherever people are present. Although present in 1983, none were taken by the Yuquí at the Chimoré mission (Stearman and Redford, 1995: 30).

Scientific synonyms used for Bolivian specimens are:

Tapirus terrestris spegazzinii Ameghino, 1909

Tapirus terrestris spegazzinii: Cabrera, 1961a: 313 ("este de Bolivia"). Suárez Morales, 1986: 40 (undocumented name in list). Anderson, 1993: 33 (general distributional records). Anderson et al., 1993: 39 (vicinity of Santa Cruz

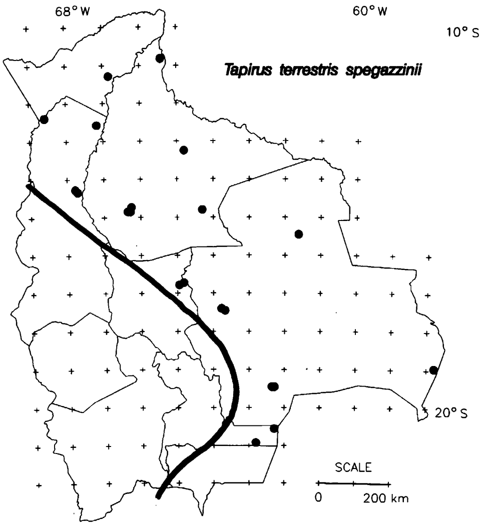


Fig. 666. Localities of known occurrence of *Tapirus terrestris spegazzinii.*

de la Sierra). Padilla and Dowler, 1994: 1 (summary for the species).

Tapirus americanus: Boule and Thevenin, 1920: 75 (Pleistocene fossil from Tarija).

Tapirus terrestris: Eisentraut, 1983: 105 (name in list). Cabot et al., 1986: 43 (undocumented name in list). Suárez Morales, 1986: 121 (undocumented name in list). Tello, 1986: 27 (discussed current status). Cameron et al, 1989: 69 (skull seen in western Pando). Stearman, 1990: 380 (Yuquí camp at 1647/6457). Ergueta and Salazar, 1991: 31 (general summary). Emmons, 1991: 72 (observed to be common at Alto río Madidi in La Paz Department). Parker et al., 1993: 30 (reported at Curuyuqui, reported by local people at Perforación, and numerous tracks seen at Yanaigua). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Stearman and Redford, 1995: 30 (Campamento Yuquí).

LOCALITIES (24) AND SPECIMENS (35): **Beni:** 1049/6525, Guayaramerin, 1 AM; 1315/6448, Yutiole, 1 AM; 1444/6615, Campamento 08, 6 MNLP; 1448/6418, Ibiato, 1 CBF; 1451/6617, río Matos, 1 EBD; 1451/6621, EBB, 1 CBF; coordinates uncertain, Arroyo Aguas Negras, 1 EBD. **Chuquisaca:** 2033/6217, Bolivian border near Sargento Rodriguez [Paraguay], 1 UCONN; 2055/6248, 64 km E of Tiquipa, Bañado Yugüapua, 1 AM. **Cochabamba:** 1643/6449, río Chimoré, 1 CBF; 1647/6457, Campamento Yuqui, 1 MNLP. **La Paz:** 1234/6710, Santa Ana de Madidi, 1 CBF; 1416/6747, 30 km NW of San Buenaventura, 1 AM; 1420/6743, 20 km NW of San Buenaventura, 1 AM. **Pando:** 1117/6650, río Madre de Dios, bank opposite Genechiquia, 1 CBF; 1223/6835, Chive, 1 CBF; coordinates uncertain, Madrid, 25 km de Comunidad Camacho, 1 CBF. **Santa Cruz:** coordinates unknown, La Chonta, río Negro, 2 MNK; 1527/6137, 70 km N of Santa Rosa de la Roca, 1 MNK; 1724/6346, río Yapacaní, 1 CM; 1727/6340, Buenavista, 1 BM (not seen), 1 FM (not seen); 1857/5747, west of Sõ Luis de Caceras, 1 US; 1927/6216, 8 km E of Estancia Cerro Colorado, 2 EBD; 1927/6221, Cerro Colorado, 4 EBD.

ORDER ARTIODACTYLA OWEN, 1848

Families and subfamilies are arranged phylogenetically, genera and species alphabetically.

Measurements of Artiodactyla in tables 16 and 17 are as follows: total length, length of tail, length of hind foot, length of ear, weight, condylobasal length, palatal length, transdental breadth, length of molariform tooth row, zygomatic breadth, interorbital breadth, length of jaw, height of jaw.

FAMILY SUIDAE GRAY, 1821

There are no native members of the pig family in the Americas.

Genus *Sus* Linnaeus, 1758

Sus scrofa Linnaeus, 1758

I do not know if there are any feral Bolivian populations of this domestic species.

Scientific names relevant for Bolivia are:

Sus Scrofa Linnaeus, 1758: 49.

Sus scrofa domesticus: Neveu-Lemaire and Grandidier, 1911: 114 (discussed the pig in Bolivia).

Sus scrofa: Mercado and Miralles, 1991: 295 (La Paz Valley).

LOCALITIES (3) AND SPECIMENS (3): **Beni:** 1428/6734, Rurrenabaque, 1 AM; 1451/6621, Reserva Biológica del Beni, 1 EBD. **Department unknown:** perhaps Bolivia, 1 MNLP.

Measurements in table 17 are of a specimen of unknown origin (AM 238325).

FAMILY TAYASSUIDAE PALMER, 1897

Husson (1978) argued for the use of the family name Dicotylidae Gray, 1868, and discussed the generic names in the family. Husson (1978: 347) cited the provision of Article 40 of the International Code of Zoological Nomenclature (ICZN, 1964) that "a family name based on a generic name considered to be a junior synonym is not to be rejected for that reason." However, this article also noted that "if a family-group name, changed before 1961 because of such synonymy, has won general acceptance, it is to be maintained in the interests of stability." My interpretation of the literature is that the name Tayassuidae Palmer, 1897, has "won general acceptance" (e.g., Cabrera, 1961a; Hall and Kelson, 1959; Grubb *in* Wilson and Reeder, 1993: 379). Grubb also placed the collared peccary in a separate genus, *Pecari* Reichenbach, 1835. The family name was misspelled as Tayassuideae by Rubio et al. (1991: 14).

Genus *Catagonus* Ameghino, 1904

Catagonus wagneri (Rusconi), 1930

Chacoan Peccary, Chancho Quimilero

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Platygonus* (*Parachoerus*) *Carlesi Wagneri* was described by Rusconi (1930: 231) type locality "Llajta-Maüca, tres leguas al noroeste de Melero, provincia de Santiago del Estero. Época moderna (precolombiana)," 28°12′S, 63°05′W, Argentina. Rusconi (1948: 231) used the name combination *Platygonus wagneri*.

Morphological Characters and Comparisons: Measurements in table 16 are from Paraguay (Wetzel, 1977) and those in table 17 are of a specimen from 40 km N of Filadelfia in Paraguay (AM 237508).

Distributional Notes: The relatively recent discovery of living populations of this large mammal, first known from archeological material, was an exciting event (Wetzel et al., 1975). Known localities are listed below and mapped in figure 667.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Conservation Status: Regarded as endangered (CITES, Appendix I).

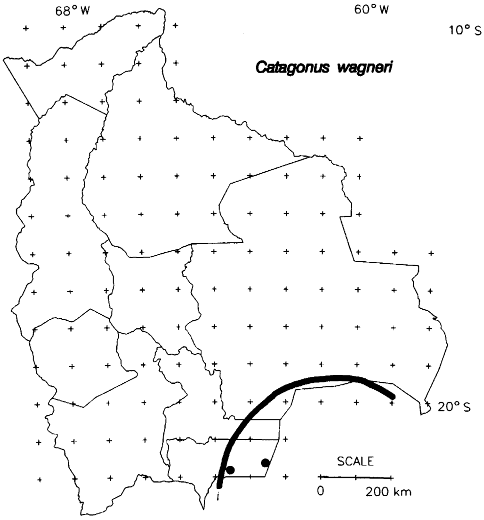


Fig. 667. Localities of known occurrence of *Catagonus wagneri*.

Scientific synonyms used for Bolivian specimens are:

Catagonus wagneri: Wetzel et al., 1975: 379 (discovery of living population). Eisentraut, 1983: 105 (name in list; 1986: 43, first report of Bolivian specimens). Mayer and Wetzel, 1986: 1 (general information). Tello, 1986: 33 (saw skulls from 30 km W of Puerto Suárez). Anderson, 1993: 33 (general distributional records). Parker et al., 1993: 103 (reported by local people at Curuyuqui).

Localities (4) and Specimens (5): **Santa Cruz:** 1957/6259, Hacienda Nueva Esperanza, 1 MNK. **Tarija:** probably Tarija, 2 (skin of adult and taxidermy mount of infant) at Parque Zoologico in Santa Cruz; 2138/6234, Estancia Bolívar, 1 CBF; 2149/6334, near Villa Ingavi, 1 (Eisentraut, 1986).

Genus *Tayassu* Fischer, 1814

Both species are regarded as threatened (CITES, Appendix II).

Tayassu pecari (Link), 1795

White-lipped Peccary, Pecari Labrado, Chancho de Tropa, Chancho Blanco

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Tayassu pecari* was described by Link (1795: 104), type locality

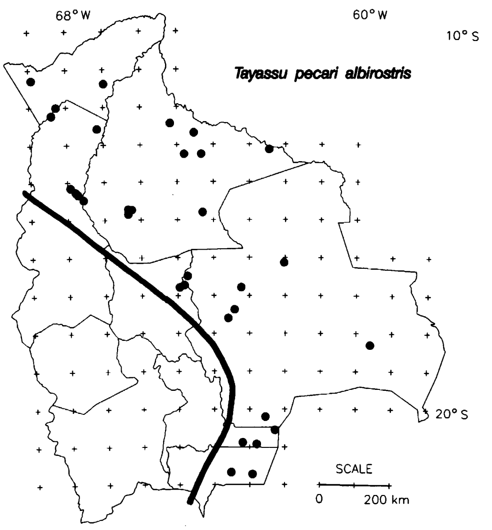


Fig. 668. Localities of known occurrence of *Tayassu pecari albirostris.*

Cayenne, French Guiana. The use of *Tayassu pecari* follows Hershkovitz (1963b) and Husson (1978), and not Cabrera (1961a). *Sus albirostris* was described by Illiger (1815: 115), type locality Paraguay.

Morphological Characters and Comparisons: Measurements in tables 16 and 17 are of specimens from 18 km SE of Carandayti (LACM 51338, 51339), 4 km N and 1 km W of Santiago de Chiquitos (AM 260331, 260332), and "Del Sara" (CM 20943, 20944). Data for Ibiato in table 13 are from W. Townsend (in litt.).

Distributional Notes: Known localities are listed below and mapped in figure 668.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: Ten females have data (W. Townsend, in litt.): one had one embryo in August, and two embryos were recorded in nine cases (2 in June, 1 in July, and 6 in August).

Conservation Status: In a study of wildlife used by the Yuquis, Stearman (1990: 379) wrote: "The Yuqui have not killed or sighted a white-lipped peccary since 1985. Prior to that time, white-lipped peccaries were hunted on an average of twice a month." Although white-lipped peccaries are known to vacate areas for lengthy periods and to have irregular migration patterns the Yuqui recalled no time in their past when peccaries disappeared for such an extended time. In the same time period and in contrast, the collared peccary seemed to be maintaining itself or slightly increasing in numbers.

Scientific synonyms used for Bolivian specimens are:

Tayassu pecari albirostris
(Illiger), 1815

Tayassu albirostris albirostris: Anderson, 1985b: 11 (undocumented name in list). Suárez Morales, 1986: 40 (undocumented name in list).

Tayassu pecari: Cabot et al., 1986: 43 (undocumented name in list). Cameron et al, 1989: 69 (local reports in western Pando). Stearman, 1990: 380 (Yuquí camp at 1647/6457). Ergueta and Salazar, 1991: 33 (general summary). Parker et al., 1993: 103 (reported by local people at Curuyuqui and Perforación). Stearman and Redford, 1995: 30 (Campamento Yuquí).

Tayassu pecari pecari: Mayer and Wetzel, 1987: 1 (general information on species).

Tayassu albirostris: Eisentraut, 1983: 108 (name in list). Suárez Morales, 1986: 121 (undocumented name in list). Tello, 1986: 31 (discussed current status). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area).

Tayassu pecari albirostris: Anderson, 1993: 33 (general distributional records). Anderson et al., 1993: 39 (vicinity of Santa Cruz de la Sierra).

Localities (36) and Specimens (213): **Beni:** 1226/6511, río Mamoré, 1 AM; 1241/6432, 15 km above Horquilla on río Machupo, 2 AM; 1308/6227, below Puerto Rubio, 1 AM; 1315/6420, Piedras Blancas, 1 MNK; 1315/6448, Yutiole, 1 AM; 1428/6734, Rurrenabaque, 1 AM; 1443/6621, 15 km N of Porvenir, 2 IE; 1444/6615, Campamento 08, 9 MNLP; 1446/6621, 9 km N and 42.5 km E of San Borja, 1 AM; 1446/6621, La Pascana, 1 IE; 1448/6418, Ibiato, 57 CBF, 58 MNK (+ 16 not seen, W. Townsend, in litt.); 1451/6621, Estación Biológica del Beni, 2 AM, 1 CBF, 2 EBD, 1 MSB; 1451/6621, Totaisal, 1 km SW of Estación Biológica del Beni, 1 AM, 2 EBD. **Chuquisaca:** 2033/6217, Bolivian border near Sargento Rodriguez, Paraguay, 6 UCONN (hunter kills, probably some from Bolivian side of border); 2053/6312, 18 km SE of Carandaiti, 3 LACM; 2055/6248, 64 km E of Tiquipa, Bañado Yugüapua, 4 AM. **Cochabamba:** 1643/6449, río Chimoré, 2 CBF; 1647/6457, Campamento Yuquí, 1 MNLP. **La Paz:** 1234/6710, Santa Ana de Madidi, 2 CBF; 1409/6755, Tumupasa, 12 AM; 1416/6747, 18 km SE of Tumupasa, 1 AM; 1420/6743, 20 km NW of San Buenaventura, 1 AM. **Pando:** 1117/6855, río Nareuda, 4 AM; 1123/6658, mouth of Arroyo Canada, 1 MSB; 1200/6816, río Madre de Dios, 5 km upstream from Cachuelas Monte Verde, 2 MSB; 1213/6824, Santa Rosa, 1 MSB. **Santa Cruz:** coordinates uncertain, La Chonta, 2 MNK; 1608/6202, Concepción, 1 MNLP; 1629/6444, río Ichilo, 54 km S of mouth of río Chapare, 1 AM; 1647/6314, Estancia Cachuela Esperanza, 1 AM; 1722/6325, province of Sara, 2 CM; 1736/6336, San Rafael de Amboró, 1 AM; 1818/5936, 4 km N and 1 km W of Santiago de Chiquitos, 2 AM, 1 MSB; 2012/6233, Puesto de Cupesi, 98 km S of Cerro Colorado, 2 EBD. **Tarija:** 1957/6259, Esperanza, 2 MNK; 2140/6332, Sunchal, between Villa Montes and Yacuiba, 2 ZFMK (R. M. Wetzel, personal commun.); 2143/6255, Estancia Samuhuate, 110 km SE of Villa Montes, 1 ZFMK (R. M. Wetzel, personal commun.).

Tayassu tajacu (Linnaeus), 1758

Collared Peccary, Pecari, Chancho de Collar, Taitetu, Huangana

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Sus tajacu* was described by Linnaeus (1758: 50); type locality "Mexici, Panamae, Brasiliae" restricted by Thomas (1911c: 140) to "Mexico"; this, however, changed by later authors to "Pernambuco, Brazil." See summary by Grubb (*in* Wilson and Reeder, 1993: 380). Thomas (1904a: 242) first used the name combination *Tayassu tajacu*.

Morphological Characters and Comparisons: Measurements in tables 16 and 17 are of specimens from 15 km SW of San Joaquín (AM 215147–215154, 215156), 6 km W of Casarabe (AM 255873), río Yapacaní (FM 21384), near Sargento Rodriguez in Paraguay (UC 17516, 18011). Data for Ibiato in table 13 are from W. Townsend (in litt.).

Distributional Notes: Known localities are listed below and mapped in figure 669.

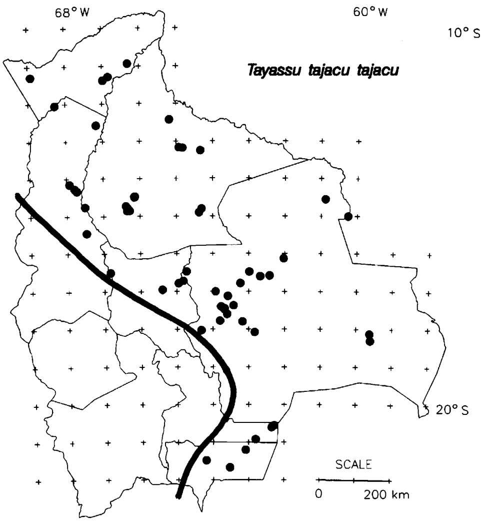


Fig. 669. Localities of known occurrence of *Tayassu tajacu tajacu.*

No detailed Bolivian data are available on habits, behavior, or food.

Reproduction: Data for 11 females are available (W. Townsend, in litt.); five had one embryo (1 in March, 1 in July, 2 in August, and 1 in September), and seven had two embryos (2 in April, 3 in August, and 2 in December).

Conservation Status: See notes in the account of *Tayassu pecari.*

Scientific synonyms used for Bolivian specimens are:

Tayassu tajacu tajacu (Linnaeus), 1758

Tayassu tajacu: Wetzel, 1977: 11. Eisentraut, 1983: 106 (name in list). Suárez Morales, 1986: 121 (undocumented name in list). Cabot et al., 1986: 43 (undocumented name in list). Cameron et al., 1989: 69 (skin seen in western Pando). Stearman, 1990: 380 (Yuquí camp at 1647/6457). Ergueta and Salazar, 1991: 32 (general summary). Emmons, 1991: 73 (seen at Alto río Madidi in La Paz department). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Parker et al., 1993: 103 (reported at Curuyuqui, Perforación, and 2003/6238). Stearman and Redford, 1995: 30 (Campamento Yuquí).

Dicotyles tajacu: Pilleri, 1977b: 48 (name in list). Eisentraut, 1933: 52 (observations near Villa Montes in Tarija, no specimen).

Tayassu tajacu tajacu: Cabrera, 1961a: 319 (no specific Bolivian locality). Suárez Morales, 1986: 40 (undocumented name in list). Anderson, 1993: 33 (general distributional records). Anderson et al., 1993: 40 (vicinity of Santa Cruz de la Sierra).

Tayassu tajaru: Tello, 1986: 29 (misspelling, discussed current status).

Pecari tajacu: Arce Pereira et al., 1963: 151 (name in list; río Chapare, Todos Santos). Grubb (*in* Wilson and Reeder, 1993: 380, name combination).

LOCALITIES (57) AND SPECIMENS (316): **Beni:** 1226/6511, río Mamoré, 2 AM; 1310/6455, Veinte y Dos, 10 AM; 1311/6449, 12 km S of San Joaquín, 1 AM; 1315/6420, Piedras Blancas, 1 MNK; 1428/6610, Estancia Katmandú, 1 MNLP; 1444/6623, 15 km N of El Porvenir, 1 CBF; 1446/6621, 9 km N and 42.5 km E of San Borja, 1 AM; 1448/6418, Ibiato, 66 CBF, 77 MNK (+ 18 CBF, 6 MNK, not seen, W. Townsend, in litt.); 1451/6617, río Matos, 1 EBD; 1451/6621, Estación Biológica del Beni, 3 AM, 5 EBD, 1 MSB; 1451/6621, Totaisal, 1 EBD; 1454/6422, 6 km W of Casarabe, 2 AM; coordinates uncertain, San Francisco del Paturubal, 1 CBF; coordinates uncertain, Vidal, 1 MNLP. **Chuquisaca:** 2033/6217, Bolivian border near Sargento Rodriguez [Paraguay], 5 UCONN (R. M. Wetzel, personal commun., some from the Bolivian side of the border); 2036/6221, 8 km E of Santa Rosa, 1 UCONN (Wetzel, 1977); 2055/6248, 64 km E of Tiquipa, Bañado Yagüapua, 6 AM. **Cochabamba:** 1630/6650, río Cotacajes, San Antonio, 1 CBF; 1643/6449, río Chimoré, 4 CBF; 1647/6457, Campamento Yuquí, 3 MNLP; 1657/6524, San Antonio, 1 AM. **La Paz:** 1234/6710, Santa Ana de Madidi 2 CBF; 1409/6755, Tumupasa, 6 AM; 1416/6747, 18 km SE of Tumupasa, 1 AM; 1420/6743, 20 km NW of San Buenaventura, 1 AM; 1445/6730, río Quiquibey, 1 MNLP; 1527/6728, Puerto Linares, 1 MNLP. **Pando:** 1056/6618, Remanso, 1 CBF; 1117/6650, río Madre de Dios, opposite Genechiquia, 1 MSB; 1117/6855, río Nareuda, 5 AM; 1122/6658, Nueva Etea, 3 MSB; 1123/6658, mouth of Arroyo Canada, 2 MSB; 1203/6817, Humaita, 1 CBF. **Santa Cruz:** 1433/6053, near Los Fierros, 1 EBD; 1500/6015, near Brazilian border, 4 US; 1608/6202, Concepción, 1 MNLP; 1628/6444, río Ichilo, 52 km S of mouth of río Chapare, 2 AM; 1629/6259, 142 km N of Santa Cruz, 3 MNLP; 1635/6225, Castedo, 2 MNK; 1647/6314, Estancia Cachuela Esperanza, 6 AM; 1636/6241, La Laguna, 2 MNK; 1700/6355, Ayacucho, 4 AM; 1707/6335, Santa Rosa [de Sara], 1 EBD; 1722/6325, Sara, 2 CM; 1724/6346, río Yapacaní, 1 CM, 1 FM; 1727/6340, Buenavista, 1 AM, 1 CM, 2 FM; 1728/6341, 2 km WSW of Buena Vista, 1 MSB; 1736/6336, San Rafael de Amboró, 28 AM; 1747/6348, 4 km S and 13 km W of San Rafael de Amboró, 1 AM; 1748/6310, Santa Cruz de la Sierra, 2 AM; 1802/6419, 6 km NNE of Quiñe (Estancia Jahue), 1 MNK; 1805/6250, Brecha 5.5, ca. 55 km SE of Santa Cruz, 1 MSB; 1807/5937, 24 km by road N of Santiago de Chiquitos, 1 LSU; 1818/5936, 4 km N and 1 km W of Santiago de Chiquitos, 3 AM, 1 MSB; unknown, 2 AM. **Tarija:** 2112/6305, 12 km SW of Capirenda, 1 LACM; 2129/6412, 5 km NNW of Entre Ríos, 1 CBF; 2140/6332, Sunchal, 14 ZFMK (R. M. Wetzel, personal commun.). **Department unknown:** perhaps Beni, 2 MNK; perhaps Bolivia, 2 MNLP.

Tayassu, species not determined

LOCALITIES (6) AND SPECIMENS (9): **Beni:** 1444/6615, Campamento Chiman (08), 3 CBF; coordinates uncertain, San Francisco del Paturubal, 1 CBF; coordinates uncertain, Laguna Bolivia, TIPNIS, 1 CBF. **Pando:** 1117/6855, río Nareuda, 1 AM (248729 young dentary only); 1203/6817, Humaita, 1 MNLP. **Department unknown:** río Beni, 1 MNLP (not seen); perhaps Bolivia, 1 MNLP.

FAMILY CAMELIDAE GRAY, 1821

The living camelids of South America are smaller than the larger Old World camels. The family had a much wider distribution in prehistoric times, occurring, for example, in North America. Possible relationships and history of the South American camelids have been discussed by various authors (e.g., Anderson, 1983a; Cardozo-Gonzales, 1954, 1975; Rubio et al., 1991: 39; Wheeler, 1991: 15). Based primarily on abundant evidence (160,000 bones deposited during 3000 years were studied) from the archaeological site at Telarmachay in Peru, Wheeler judged that llamas were domesticated from guanacos and alpacas from vicunas.

The importation of Old World camels, presumably *Camelus dromedarius*, into the province of Sud Chichas in the department of Potosí was reported by Chacón (1892: 211). They were said to have acclimatized with the greatest of ease, but I have no further record of their continued presence.

Genus *Lama* G. Cuvier, 1800

Subgenus *Lama* G. Cuvier, 1800

Lama (*Lama*) *glama*
Linnaeus, 1758

Llama

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Camelus Glama* was described by Linnaeus (1758: 65); type locality "America *meridionali*" restricted by Thomas (1911c: 150) to Peru. Thomas (1891: 387) first used the name *Lama glama*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in table 17 are of a specimen from a zoo (AM 35235). I have no measurements of a Bolivian specimen.

DISTRIBUTIONAL NOTES: A domesticated species throughout the highlands.

Scientific synonyms used for Bolivian specimens are:

Auchenia lama: Créqui Montfort and Sénéchal de la Grange, 1904: 98 (for Bolivian llama).

Lama glama: Neveu-Lemaire and Grandidier, 1911: 17 (Bolivia, no specimen). Anderson, 1983a: 3 (discussed relationships of camelids). Mercado and Miralles, 1991: 295 (La Paz Valley). Rubio et al., 1991: 117 (color photograph). Tomka, 1992 (study of llama behavior at Villa Alota, Nor Lipes province, Potosí). Anderson, 1993: 33 (brief note only).

LOCALITIES (2) AND SPECIMENS (3): **La Paz:** 1502/6913, 5 km E of Ulla Ulla, 2 AM (crania only); coordinates uncertain, Huancasaya, Reserva Ulla Ulla, 1 IE.

Lama (*Lama*) *guanicoe*
(Müller), 1776

Guanaco

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Camelus guanicoe* was described by Müller (1776: 50), type locality "Patagonien." Osgood (1921: 39) first used the name combination *Lama guanicoe*.

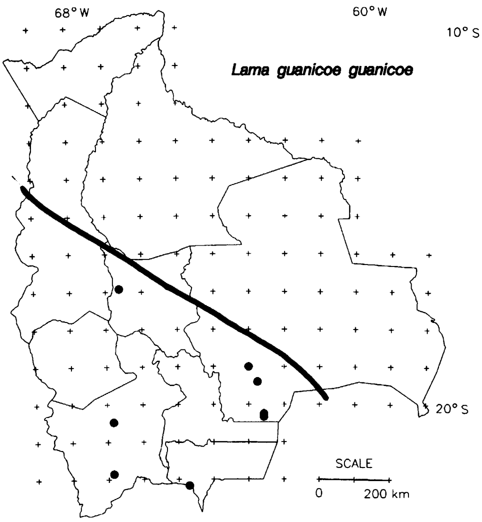


Fig. 670. Localities of known occurrence of *Lama guanicoe guanicoe*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in table 17 are of a specimen from Chile (AM 143242).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 670. Reed (1992: 33) published a photograph of a herd of guanacos, taken in 1991 near 2003/6238 in southern Santa Cruz. This is the last Bolivian area known to sustain a wild population.

No detailed Bolivian study has been published on habitat, habits, behavior, food, or reproduction.

CONSERVATION STATUS: Regarded as threatened (CITES, Appendix II). Nearly extinct in Bolivia (Villalba, 1992: 45). Alzerreca (1982: 15) reported a few ("pocas") surviving in the Cordillera de Mochara (2120/6528) and the Zona Estancia Perforación in the Chaco.

Scientific synonyms used for Bolivian specimens are:

Lama guanicoe guanicoe
(Müller), 1776

Lama guanicoe: Cardozo, 1975: 85. Torres, 1985: 6 (Cardozo estimated 54 individuals at two sites in Bolivia in 1985). Ergueta and Salazar, 1991: 34 (general summary). Parker et al., 1993: 39, 101 (reported at Perforación, observation and photos of herd near 2003/6238 in southern Santa Cruz). Anderson, 1993: 34 (general distributional records). Durden and Musser, 1994: 47 (type host of *Linognathus praelongiceps*, a sucking louse, type locality Choquecomato). Ibáñez et al., 1994: 81 (first specimens from Santa Cruz).

Lama huanachus: Thomas, 1902a: 143 (Choquecamate). Neveu-Lemaire and Grandidier, 1911: 17 ("Andes peruviennes, boliviennes. . .").

Lama guanicoë voglii Krumbiegel, 1943: 56 (type locality "Nordargentinien bis etwa 32.° s. Br. im Suden."; Uyuni, Serra de Lipez, Oberer Bermejo, Westlicher Chaco am Izozoa).

Lama guanicoe vogli: Haltenorth and Trense, 1956: 312 (cite Krumbiegel and note "Westbolivien").

Lama guanicoe guanicoe: Cabrera, 1961a: 322 ("sur de Bolivia"). Anderson, 1983a: 3 (discussed relationships of camelids). Suárez Morales, 1986: 39 (undocumented name in list). Yensen and Tarifa, 1993: 60 (local reports and possible occurrence near Sajama).

Lama quanicoë cacsilensis: Franklin *in* Mares and Genoways, 1982: 464 (notes questionable validity of this subspecies).

Localities (9) and Specimens (11): **Cochabamba:** 1655/6637, Choquecamate, 1 BM (Thomas, 1902a: 143). **La Paz:** 1630/6809, "La Paz" (coordinates of the city), 2 (Krumbiegel, 1943: 59). **Potosí:** 2028/6650, Uyuni (Krumbiegel, 1943: 51, also source of quote below); 2151/6651, Sierra de Lipez ("Für Serra de Lipez und Uyuni ist das Guanako von Prinzessin Therese von Bayern angegeben"). **Santa Cruz:** 1900/6300, Campo de Guanacos, 3 (Krumbiegel, 1943: 59); 1924/6245, Izozog (Krumbiegel, 1943: 56 "Im westlichen Chaco am Izozog"; 2015/6234, Rancho Chico, 1 EBD; 2020/6234, 40 km S of Perforación, 1 EBD (not seen). **Tarija:** 2210/6442, Oberer Bermejo (Krumbiegel, 1943: 56 "Nach Krieg [1940] sind Guanakos noch vor 30 Jahren im Gran Chaco am oberen Bermejo vorgekommen"). **Department unknown:** "Bolivia" only, 2 FM; coordinates uncertain, "Anden (Bolivia)," 1 Bern (Schmid, in litt.).

Lama, species not determined

Localities (3) and Specimens (8): **La Paz:** 1502/6913, Reserva Ulla Ulla, 2 CBF; 1630/6809, La Paz (assumed to be the city), 3 MACN (not examined). **Potosí:** 2141/6729, 7 km N of Cerro Quetena, 1 CBF. **Department unknown:** "Bolivia," 2 MACN (not examined).

Subgenus *Vicugna* Lesson, 1842

Lama (*Vicugna*) *pacos* (Linnaeus), 1758

Alpaca

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Camelus Pacos* was described by Linnaeus (1758: 66); type locality "America *meridionali*" restricted to Peru by Thomas (1911e: 150). Fischer (1829: 437) first used the name *Lama pacos*. Wheeler (1991: 32) judged that alpacas were domesticated some 6000 years ago from vicuñas and somewhat equivocally used the name *Vicugna pacos* (as well as the name *Lama pacos*).

Morphological Characters and Comparisons: Gray (1852a: 255) noted that "in confinement, the *Vicuna* and the *Alpaca* often have the lower cutting-teeth elongated and projecting . . .." The persistent growth of vicuña lower incisors was described later by Miller (1924). Miller contrasted these teeth in vicugnas and guanacoes, but did not note the condition in alpacas. Skulls of vicuñas and alpacas were compared by Otte and Venero (1979). Measurements in tables 16 and 17 are of a specimen from 5 km E of Ulla Ulla (AM 248739).

Distributional Notes: Alpacas are kept as domestic animals throughout the Bolivian highlands.

Scientific synonyms used for Bolivian specimens are:

Lama pacos: Neveu-Lemaire and Grandidier, 1911: 12 (report for Bolivia, no specimen). Anderson, 1983a: 3 (discussed relationships of camelids). Mercado and Miralles, 1991: 295 (La Paz Valley). Rubio et al., 1991: 113 (color photograph). Anderson, 1993: 34 (brief note only).

Auchenia paco: Créqui Montfort and Sénéchal de la Grange, 1904: 98 (for Bolivian alpaca).

Vicugna pacos: Wheeler, 1991: 32 (discussed relationships of camelids).

Localities (7) and Specimens (17): **La Paz:** 1502/6913, 5 km E of Ulla Ulla, 5 AM (one complete skeleton, and bone fragments, perhaps of this species), 1 MNLP (skull);

1502/6913, Cabaña, río Canuma, 2 CBF; the following are all from the Ulla Ulla Reserva but exact coordinates are unknown, 1 EBD; Cabaña-Colinas, 1 IE; Bofedal Jahiska Huira, 1 CBF; Huancasaya, 3 IE; Huacachani, 1 IE; río Tambillo, 1 IE; 1648/6853, 14 km by road SW of San Andrés de Machaca, 1 MSB.

Lama (*Vicugna*) *vicugna* (Molina, 1782)

Vicuña, Huari (Quechua),
Sawalla (Aimara)

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Camellus Vicugna* was described by Molina (1782: 313), type locality Andes de Coquimbo y Copiapo, Chile. Miller (1924: 2) first used the name *Vicugna vicugna*. *Lama vicugna mensalis* was said by Thomas (1917c) to differ from *L. l. vicugna* in slightly smaller size, much smaller teeth, and more fulvous pelage. The length of molars of the holotype was given as 45 mm; the greatest length of skull was 240 mm.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in table 17 are of young specimens from 5 km E of Ulla Ulla (AM 247747, 248742) and the department of Potosí (AM 15997).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 671.

No detailed Bolivian study has been published on habitat, habits, behavior, food, or reproduction.

CONSERVATION STATUS: Regarded as endangered (CITES, Appendix I). Jungius (1970, 1971, 1972) studied vicuña and recommended measures for its conservation. Alzarreca (1982) documented an increase from 1097 in 1969 to 7150 in 1982 in Bolivian vicuña populations in 12 areas of protection. See also Cardozo-Gonzalez (1980) and Villalba (1992).

Scientific synonyms used for Bolivian specimens are:

Lama Vicuna: Gray and Gray, 1847: 62 (two specimens from "Bolivia" in Bridges's coll.).

Lama Vicugna: Gray, 1852a: 257 ("Bolivia," two specimens).

Llama vicugna: Gerrard, 1862: 272 (two Bolivian specimens in Bridges's coll.).

Lama vicugna: Thomas, 1902a: 143 (Choquecamate). Neveu-Lemaire and Grandidier, 1911: 17 (Yura). Tate, 1931a: 252 ("I saw these animals once in Bolivia while crossing the Puna in a train. A group of three or four were together running parallel with the track."). Jungius, 1971: 130 (map, summary of Bolivian records, estimated 1000 to 1500 for Bolivia). Anderson, 1983a: 3 (discussed relationships of camelids).

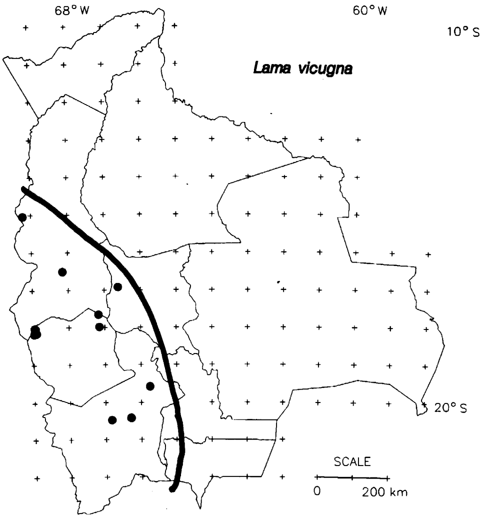


Fig. 671. Localities of known occurrence of *Lama* (*Vicugna*) *vicugna*.

Auchenia vicunna: Créqui Montfort and Sénéchal de la Grange, 1904: 96 (five specimens from between Pulacayo and Yura south of Cerro Tumula).

Lama vicugna mensalis Thomas, 1917c: 3 (type locality "Incapirra, Junin, Peru"; "Bolivia"). Franklin *in* Mares and Genoways, 1982: 465 (ecology and status).

Lama vicugna vicugna: Krumbiegel, 1943: 60 (La Paz, Uyuni, Oruro).

Vicugna vicugna: Ibáñez in Alzerreca, 1982: 63 (Reserva Avaroa). Torres, 1983: 8 (estimated numbers in Bolivia). Suárez Morales, 1986: 39, 52 (undocumented name in list). Salazar, 1990: 190 (observed at four places in the Reserva "Eduardo Abaroa"). Ergueta and Salazar, 1991: 33 (general summary). Wheeler, 1991: 21 (discussed camelid relationships). Rubio et al., 1991: 113 (color photograph). Tomka, 1992: 408 (compared behavior of vicuñas and llamas). Anderson, 1993: 34 (general distributional records). Yensen and Tarifa, 1993: 54 (skulls from two localities and photos from two, all near Sajama). Yensen et al., 1994: 410 (1801/6857, 1802/6856).

LOCALITIES (25) AND SPECIMENS (50): **Co-**

chabamba: 1655/6637, Choquecamate, 2 BM (Thomas, 1902a). **La Paz:** 1502/6913, 5 km E of Ulla Ulla or Cabaña, 1 skeleton and 3 bone fragments AM, 1 CBF (Jungius estimated about 150 near here in 1971; population on reserve here was back up to about 1000 animals in 1980); 1 MNLP; 1502/6913, Ulla Ulla (coordinates uncertain), 3 EBD; 1630/6809, vicinity of La Paz (Krumbiegel, 1943: 60, after Princess Therese von Bayern); 1630/6809, La Paz (coordinates are of the city), 1 MACN (not seen); all of the following are from the Reserva Ulla Ulla but exact coordinates are unknown; Chiarkota, 1 IE; río Huancasaya, 16 IE; Huancasaya-Chuichimi, 1 IE; Socondori Pampa, 3 IE; Kollopampa, 1 IE; Reserva Ulla Ulla only, 2 IE; Jonka Pampa, 1 IE; Mohon Collo, 1 IE; Jahuijawira, 1 IE; Jiska-jahuira, 1 IE; Estancia Huacuchani, 1 IE. **Oruro:** 1739/6710, cerca Caracollo, 1 MNLP; 1759/6709, Oruro (Krumbiegel, 1943: 60, after Princess Therese von Bayern); 1801/6857, Quebrada Viscachani, 14 km N and 1 km E of Sajama village, photos (Yensen et al., 1994: 410); 1802/6856, Laguna Huana Khota, 10 km N and 4 km E of Sajama village, photos (Yensen et al., 1994: 410); 1809/6854, south base of Mount Sajama, Jacha Khaca, 1 CBF (= Jiskha Khara Huinchinca Loma, Yensen et al., 1994: 410); 1810/6858, Base camp 1, SW of Mount Sajama, 1 CBF (Yensen et al., 1994: 410). **Potosí:** 1935/6545, "Potosí" only, 1 AM; 2014/6613, "Cerro Tumula, pies de Yura," 5 Paris (Neveu-Lemaire and Grandidier, 1911); 2028/6650, Uyuni (Krumbiegel, 1943: 60, after Princess Therese von Bayern). **Department unknown:** "Bolivia," 2 BM (Gerrard, 1962: 272), 1 La Plata.

FAMILY CERVIDAE GOLDFUSS, 1820

SUBFAMILY ODOCOILEINAE POCOCK, 1923

TAXONOMIC REMARKS: Grubb (*in* Wilson and Reeder, 1993: 389) used *Blastocerus* Gray, 1850, for *B. dichotomus*, and (on p. 391) used *Ozotoceros* Ameghino, 1891, for *O. bezoarticus*.

Genus *Hippocamelus* Leuckart, 1816

TAXONOMIC REMARKS: Haltenorth (1963: 46) treated *Hippocamelus* as a subgenus of *Odocoileus*.

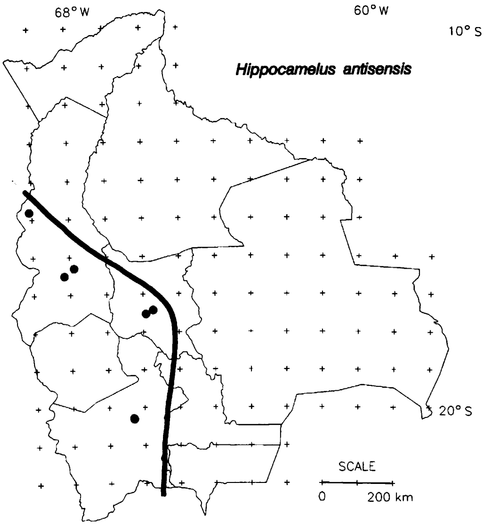


Fig. 672. Localities of known occurrence of *Hippocamelus antisensis*.

Hippocamelus antisensis (d'Orbigny *in* Geoffroy and Blainville), 1834

Taruca, Guemal, Ciervo Andino, Northern Huemul

TAXONOMIC REMARKS: In early years, there were lively debates, based on few specimens and various tenuous surmises, about the relationships of and the number of species of the huemul deer of the South American Andes. Many names and name combinations have been used for this species. Neveu-Lemaire and Grandidier (1906) published an early synonymy. Cabrera (1961a: 332) later provided a lengthy synonymy; many of these names pertain to Bolivia, by inference and under the assumption that the type locality is in Bolivia, but not all of these variant names are included in the synonymy below.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 16 and 17 are of specimens from Cerro Juno (BM 34.9.2.188 and 189) and Cerro San Benito (BM 34.9.2.190).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 672. Créqui Montfort and Sénéchal de la Grange (1904: 96) reported two "venados" or "tarouca" (Quechua) from between Pulacayo and Yura south of Cerro Tumula at 5000 m elevation, but used no scientific name. These are presumably *Hippocamelus antisensis*.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

CONSERVATION STATUS: Regarded as endangered (CITES, Appendix I).

Scientific synonyms used for Bolivian specimens, directly or by inference, are:

Cervus antisensis d'Orbigny *in* Geoffroy and Blainville, 1834: 91 (type locality Andes of Bolivia near La Paz, at about 3500 m elevation). D'Orbigny and Gervais, 1847: 28 (a pair from Bolivia taken by M. Pentland and deposited in Paris; in elevated areas of the Cordillera Oriental in La Paz, Cochabamba, and Chuquisaca, rarely descending below 3500 m). Lydekker, 1898, cited the Puruvian Andes as the type locality.

Cervus (Furcifer) antisiensis: Wagner, 1844: 384 (spelling).

Furcifer antisiensis: Gray, 1873a: 446 (referred to Bolivia).

Cervus antisiensis: Sclater, 1873: 214 (referred to Bolivia).

Creagroceros antisiensis: Fitzinger, 1873: 358 (referred to Bolivia).

Furcifer antisensis: Nehring, 1895: 9 (name combination).

Mazama antisiensis: Lydekker, 1898: 295 (name combination).

Hippocamelus antiensis: Neveu-Lemaire and Grandidier, 1906: 485 (Cordillera Oriental; regarded "*antisiensis*" of d'Orbigny, 1834, as a nomen nudum and used *antisiensis* of Pucheran, 1842, spelled as *antiensis* in the header but not in the text).

Hippocamelus antisiensis: Elliot, 1907: 52 (name combination). Neveu-Lemaire and Grandidier, 1911: 17 (Cerro Tumula, near Yura). Beaufort, 1963: 571 (type list). Suárez Morales, 1986: 39 (undocumented name in list). Ergueta and Salazar, 1991: 35 (general summary).

Odocoileus antisensis: Dabbene, 1911: 293 (name combination). Rubio et al., 1991: 35, 40 (name combination).

Hippocamelus antisensis: Lydekker, 1915: 196 (first use of name combination). Cabrera, 1961a: 332·(provided a lengthy synonymy; all of these names, by inference, pertain to Bolivia, but are not repeated here). Jungius, 1974: 382 (report, no specimen). Miller et al., 1983: 345 ("There is no evidence that populations remain in Bolivia or Argentina"; H. Jungius, personal commun.). Suárez Morales, 1986: 52 (name in list). Hershkovitz, 1987b: 75 (La Paz, Cochabamba, Chuquisaca; citing d'Orbigny and Gervais, 1847). Mercado and Miralles, 1991: 295 (La Paz Valley). Anderson, 1993: 34 (general distributional records). Yensen and Tarifa, 1993: 60 (reports from local people near Sajama). Yensen et al., 1994: 410 (1618/6753).

Hyppocamelus antisiensis: Suárez Morales, 1986: 114 (name in list).

LOCALITIES (6) AND SPECIMENS (12): **Cochabamba:** 1725/6543, Cerro Juno, 2 BM (not seen); 1731/6555, Cerro San Benito, 1 BM (not seen). **La Paz:** 1448/6904, Near Pelechuco (Jungius, 1974: 382; "eastern slopes of the Andes in the Cordillera of Apolobamba between 3,900 and 4,100 m. altitude"); 1618/6753, head of río Aceromarca valley, 1 CBF (Yensen et al., 1994: 410); 1630/6809, Andes near La Paz, 3 Paris (not seen). **Potosí:** 2014/6613, "Cerro Tumula," near Yura, 1 Paris (Neveu-Lemaire and Grandidier, 1906: 485; 1911: 77). **Department unknown:** perhaps Bolivia, 4 MNLP.

Genus *Mazama* Rafinesque, 1817

TAXONOMIC REMARKS: Haltenorth (1963: 47) included *Pudu* Gray, 1850, in the genus *Mazama*, as a subgenus.

PARASITOLOGY: The flea *Ctenocephalides felis felis* was reported from "*Coassus* sp." from Santa Cruz de la Sierra by Hopkins and Rothschild (1953: 154).

Mazama americana (Erxleben, 1777)

Venado Rojo, Urina, Corzuela, Guazu-pihta, Guazo, Red Brocket

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Moschus americanus* was described by Erxleben (1777: 324); type locality "Habitat in Guiania et Brasilia" restricted by Allen (1915b: 533) to "Cayenne," French Guiana. If subspecies are to be recognized in this species, the nominate subspecies probably does not occur in Bolivia. In the absence of an adequate revision all, Bolivian records are here listed under the species name alone. *Mazama zamora* was described by Allen (1915b: 546); type locality is "Zamora (altitude 2000 feet), southeastern Ecuador."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 16 and 17 are of specimens from the río Challana (UM 126854, 126855), the río Yapacaní (CM

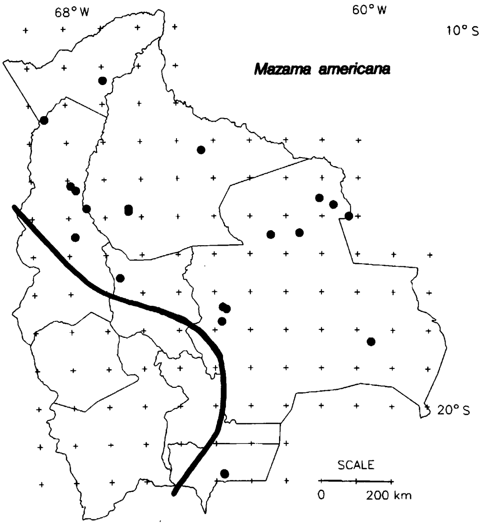


Fig. 673. Localities of known occurrence of *Mazama americana.*

2767), 9 km N and 42.5 km E of San Borja (AM 260336), Beni Reserva Biológica (MNLP 527). Data for Ibiato in table 13 are from W. Townsend (in litt.).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 673.

No Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: I have data on only one pregnant female, with one embryo in October. Two lactating females were recorded in April and August (from W. Townsend, in litt.).

Scientific synonyms used for Bolivian specimens are:

Mazama rufa: Thomas, 1902a: 143 (Charuplaya). Neveu-Lemaire and Grandidier, 1911: 17 (following Thomas, the type locality for this name of Illiger is in Paraguay).

Mazama sarae Thomas, 1925: 581 (type locality "Carapari, 1000 m." in Tarija, Bolivia).

Mazama americana zamorae: Haltenorth and Trense, 1956: 342 ("Nord bolivien").

Mazama americana sarae: Cabrera, 1961a: 336 (first use of name combination).

Mazama americana rufa: Cabrera, 1961a: 336 (first use of name combination).

Masama americana: Arce Pereira et al., 1963: 151 (name in list; Todos Santos).

Mazama americana: Cabot et al., 1986: 43 (undocumented name in list). Suárez Morales, 1986: 40 (undocumented name in list). Tello, 1986: 33 (observed at Monte San Pablo, río San Pablo, Piedras Blancas, Totaitu, Zapoco, and near San Javier, and reported from other localities). Cameron et al, 1989: 69 (observations in western Pando). Stearman, 1990: 380 (no voucher specimen; Yuqui camp at 1647/6457). Emmons, 1991: 73 (seen at Alto río Madidi in La Paz department). Hinojosa, 1991, 1992 (Serranía Eva Eva). Anderson, 1993: 34 (general distributional records). Anderson et al., 1993: 40 (vicinity of Santa Cruz de la Sierra). Parker et al., 1993: 54 (seen at San Fernando). Stearman and Redford, 1995: 30 (Campamento Yuqui).

Mazama nana: Suárez Morales, 1986: 40 (undocumented name in list, Parque Nacional Isiboro Sécure).

LOCALITIES (24) AND SPECIMENS (53): **Beni:** 1315/6420, Piedras Blancas, 1 MNK; 1446/6621, 9 km N and 42.5 km E of San Borja, 1 AM, 1 MNLP; 1448/6418, Ibiato, 11 CBF (not seen, W. Townsend, in litt.); 1451/6621, on road San Borja to San Ignacio, 1 EBD; 1451/6621, Totaisal, 3 EBD. **Cochabamba:** 1636/6637, Charuplaya, 1 BM (Thomas, 1902). **La Paz:** 1409/6755, Tumupasa, 8 AM (three of uncertain identity); 1416/6747, 18 km SE of Tumupasa, 3 AM; 1445/6730, río Quiquibey, 1 MNLP; 1530/6750, río Challana, 5 km SE of Guanay, 2 UMMZ (not seen). **Pando:** 1122/6658, Nueva Etea, 1 MSB; 1223/6835, Chivé, 1 MSB. **Santa Cruz:** 1432/6104, Km 20 E of Aserradero Moira, 1 EBD; 1442/6041, Km 60 E of Aserradero Moira, 1 EBD; 1500/6015, about 15°S latitude, near the Brazilian border, 2 US (one not seen); 1527/6137, La Junta, 70 km N of Santa Rosa, 1 MSB; 1530/6225, Puerto Almacen, río Negro, 70 km NNW of Concepción, 5 EBD; 1724/6346, río Yapacaní, 1 CM; 1727/6340, Buenavista, 1 CM; 1747/6348, 4 km S and 13 km W of San Rafael de Amboró, 1 AM; 1818/5936, 4 km N and 1 km W of Santiago de Chiquitos, 1 AM; coordinates uncertain, Perseverencia, 1 MNK. **Tarija:** 2148/6347, 3 km WNW of Caraparí, 1 AM; 2149/6346, Caraparí, 1 BM (Thomas, 1925). **Department unknown:** "Santa Cruz," but data dubious, 1 MNLP.

Mazama bricenii Thomas, 1908

Vernacular names are Mountain Mazama, Dwarf Brocket, Corzuela, Urina Enana, and

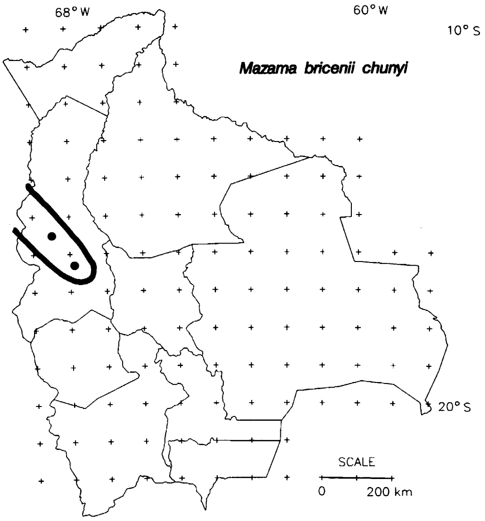


Fig. 674. Localities of known occurrence of *Mazama bricenii chunyi*.

the species is known as Cuni to the people in Pelechuco and Ulla Ulla.

TAXONOMIC REMARKS: The name used for the species has its type locality outside of Bolivia. *Mazama bricenii* was described by Thomas (1908: 349); type locality "Paramo de la Culata, Merida, Venezuela. Altitude 3000 m." Jungius's misspelled use of *M. brincenii* was not documented with evidence or discussion. Presumably he was following the usage of Haltenorth (1963: 48). Both *M. bricenii* and *M. chunyi* are small *Mazama* and they might be conspecific. The greatest length of the skull of the holotype of *Mazama bricenii* is 159 mm (Thomas, 1908) whereas that of *Mazama chunyi* is less than 150 mm. This taxonomic assumption of conspecificity has not been rebutted or argued in the literature. In his original description of *M. chunyi*, Hershkovitz (1959c) did not compare it with *M. bricenii*. Hershkovitz has a revision of *Mazama* in preparation. Its publication should clarify the matter.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 16 and 17 are of the holotype (AM 73093), a young animal.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 674.

HABITAT: Known in Bolivia only from the Yungas of La Paz. Tate (1931a: 252) noted temperate forest with moss-hung trees at the type locality.

No Bolivian data are available on habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Mazama bricenii chunyi Hershkovitz, 1959

Pudua: Tate, 1931a: 252 (reported under this name the capture of the specimen later made holotype of *chunyi*).

Mazama chunyi Hershkovitz, 1959c: 45 (type locality Cocapunco, department of La Paz, Bolivia). Hershkovitz, 1982: 26–28, 32–37 (drawings and photos of holotype, AM 79912). Nowak and Paradiso, 1983: 1218 (Bolivia). Grubb *in* Wilson and Reeder, 1993: 390. Yensen et al., 1994: 411 (Unduavi).

Mazama bricenii chunji: Haltenorth, 1963: 48.

Mazama brincenii chunji: Jungius, 1974: 380 (Pelechuco).

Mazama bricenii chunyi: Suárez Morales, 1986: 41 (undocumented name in list). Anderson, 1993: 34 (general distributional records).

LOCALITIES (2) AND SPECIMENS (2): **La Paz:** 1530/6829, Cocapunco, 1 AM; 1618/6753, río Unduavi, 1 CBF.

Mazama gouazoupira (Fischer, 1814)

Gray Brocket, Urina Gris, Guazu-bira, Huazu

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Cervus gouazoupira* was described by Fischer (1814: 465); type locality Paraguay restricted by Cabrera (1961a: 339) to vicinity of Asunción. *Mazama rufina* was reported by Tello (1986: 35) as having been observed at Los Tolumus, Los Palmeres, and 10 km W of Puerto Suáres. No specimen was noted.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 16 and 17 are of specimens from Veinte y Dos (AM 215142–215144), 20 km S of San Joaquín (AM 214753, 214755, 215141), 6 km S and 10 km E of Comarapa (AM 246985), and 7 km N of Capirenda (LACM 52336). Data for Ibiato in table 16 are from W. Townsend (in litt.).

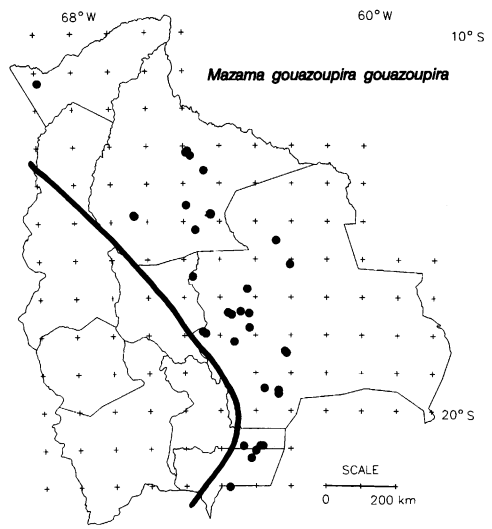


Fig. 675. Localities of known occurrence of *Mazama gouazoupira gouazoupira.*

Distributional Notes: Known localities are listed below and mapped in figure 675.

No Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: Two pregnant females, each with one embryo, were recorded in September and December. Two lactating females were recorded in September and November (W. Townsend, in litt.).

Scientific synonyms used for Bolivian specimens are:

Mazama gouazoupira gouazoupira (Fischer), 1814

Mazama nemorivaga: Neveu-Lemaire and Grandidier, 1911: 32 ("la Bolivie").

Mazama simplicicornis: Eisentraut, 1933: 53 (a few observations from the Bolivian Chaco near Villa Montes, no specimen).

Mazama gouazoubira gouazoubira: Hershkovitz, 1951: 567 (implied use of name combination).

Mazama simplicicornis nana: Haltenorth and Trense, 1956: 343 ("Ostbolivien").

Mazama gouazoubira: Suárez Morales, 1986: 121 (undocumented name in list). Cabot et al., 1986: 43 (undocumented name in list). Tello, 1986: 35 (notes on status, also reported seeing *Mazama rufina* but there are no specimens and the basis for this identification is unclear). Cameron et al, 1989: 69 (observations in western Pando). Parker et al., 1993: 30, 39 (abundant at Curuyuqui; three seen near Perforación, 2003/6238 in southern Santa Cruz, and two seen at Yanaigua). Anderson, 1993: 34 (general distributional records).

Mazama guazoubira: Suárez Morales, 1986: 41 (undocumented name in list).

Mazama gouazoupira: Grubb *in* Wilson and Reeder, 1993: 391.

Mazama gouazoubira gouazoubira: Anderson et al., 1993: 40 (vicinity of Santa Cruz de la Sierra).

Localities (34) and Specimens (83): **Beni:** 1308/6453, 10 km SW of San Joaquín, Estancia Yutiole, 2 AM; 1310/6455, Veinte y Dos, 3 AM; 1315/6448, 20 km S of San Joaquín, 4 AM; 1339/6426, Estancia El Valle, 1 MSB; 1434/6455, 23 km W of San Javier, 1 AM; 1448/6418, Ibiato, 8 CBF, 6 MNK (not seen, W. Townsend, in litt.); 1450/6622, Los Tajibos, 40 km E of San Borja, 1 EBD; 1451/6621, Reserva Biológica del Beni, 1 EBD; 1451/6621, Totaisal, 2 EBD; 1513/6440, near Loreto, 1 AM. **Chuquisaca:** 2055/6248, 64 km E of Tiquipa, Bañado Yugüapua, 4 AM; 2055/6252, 56 km E of Tiquipa, 1 AM; 2056/6321, 2 km S and 10 km E of Tiquipa, Laguna Palmar, 1 AM. **Cochabamba:** 1627/6445, río Ichilo, 27 km N of mouth of río Chimoré, 1 AM. **Pando:** 1117/6855, río Nareuda, 2 AM. **Santa Cruz:** 1530/6225, Puerto Almacen, 1 EBD; 1608/6202, Concepción, 2 MNLP; 1647/6314, Estancia Cachuela Esperanza, 2 AM; 1722/6325, río Surútu, province of Sara, 1 CM; 1724/6346, río Yapacaní, 2 FM; 1725/6311, 10 km S of Montero, 1 MSB; 1727/6340, Buenavista, 10 BM (not seen), 3 CM, 2 FM, 4 MACN (Crespo, 1974: 20); 1748/6310, Santa Cruz de la Sierra, 1 BM; 1754/6429, California, 1 AM; 1757/6424, 6 km S and 10 km E of Comarapa, 1 AM; 1810/6336, Vermejo, 1 AM; 1825/6210, Tita, 1 AM, 1 MSB; 1828/6207, 8 km SE of Tita, 1 AM; 1924/6245, Bañados de Isozog, 2 EBD; 1927/6221, Cerro Colorado, 1 EBD; 1933/6221, 10 km S of Cerro Colorado, 1 EBD. **Santa Cruz:** 1725/6311, 10 km S of Montero, 1 Hayward coll.; 1727/6340, Buenavista, 2 ANSP, 4 MACN (not seen). **Tarija:** 2241/6426, río Lipeo, 1 ANSP. **Department unknown:** perhaps Bolivia, 2 MNLP.

Genus *Odocoileus* Rafinesque, 1832

Taxonomic Remarks: Haltenorth (1963: 42) included *Hippocamelus* Leuckart 1816, *Blastoceros* Wagner 1844, *Blastoceros* Fitzinger 1860, *Ozotoceros* Ameghino 1891, *Bezoarticus* Marelli 1932, and *Edocerus* Avile-Pires 1957 in the genus *Odocoileus*.

Subgenus (*Blastocerus*)
Gray, 1850

Type species *Cervus paludosus* Desmarest, by monotypy (Gray, 1850a: 68). Nomenclatural problems with generic names of cervids were discussed by Hershkovitz (1958b), who accepted the use of *Blastocerus* Gray, 1850, as the first valid generic name for the marsh deer. Wagner (1844: 366) had used *Blastocerus* for a group of three species within the subgenus *Elaphus*. Hershkovitz (1958b) also accepted *Blastoceros* Fitzinger, 1860, rather than *Ozotoceros* Ameghino, 1891, for the pampas deer. This usage has not been followed by many subsequent authors. I do not know whether this has been done to avoid the use of such similar names or for other reasons.

Odocoileus dichotomus
(Illiger, 1815)

Swamp Deer, Ciervo or Venado de los Pantanos, Guazu-pucu

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Cervus dichotomus* was described by Illiger (1815: 117); type locality Paraguay restricted to laguna of Ypoa, south of Asunción), by Cabrera (1961a: 329). Haltenorth and Trense (1956: 338) used the name combination *Odocoileus* (*Dorcelaphus*) *dichotomus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Data for Ibiato in table 16 are from W. Townsend (in litt.). Measurements in table 17 are of a specimen from Buenavista (BM 11.10.27.4).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 676.

No Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: A "very very young" individual was recorded in November; no other data are available.

CONSERVATION STATUS: Regarded as endangered (CITES, Appendix I).

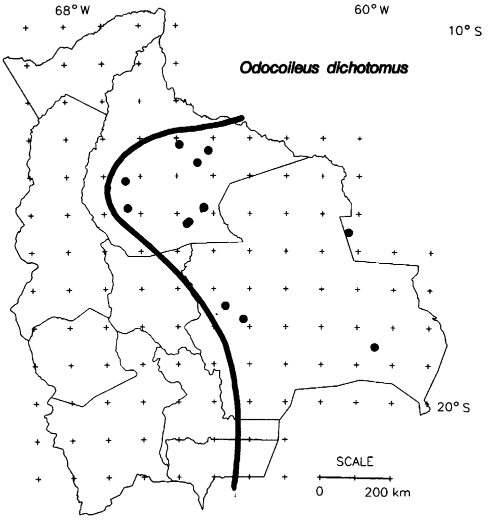


Fig. 676. Localities of known occurrence of *Odocoileus* (*Blastocerus*) *dichotomus*.

Scientific synonyms used for Bolivian specimens are:

Cervus paludosus: d'Orbigny and Gervais, 1847: 27 (Chiquitos).

Odocoileus (*Dorcelaphus*) *paludosus*: Krumbiegel, 1945: 69 (San Ramón, Santa Cruz de la Sierra).

Blastocerus dichotomus: Vieira, 1955: 460 ("Bolivia"). Schuerholz and Mann, 1977 (observed 12 in the Beni, some near Santa Ana, and give measurements of two specimens on p. iv, but do not give localities for them). Nowak and Paradiso, 1983: 1215 (Bolivia). Cabot et al., 1986: 43 (undocumented name in list). Tello, 1986: 35 (discussed current status in the Beni). Hershkovitz, 1987b: 75 (Chiquitos; citing d'Orbigny and Gervais, 1847). Ergueta S. and Salazar B., 1991: 35 (general summary). Pinder and Grosse, 1991: 1 (general biology of species).

Odocoileus dichotomus: Suárez Morales, 1986: 41, 123 (undocumented name in list). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Anderson, 1993: 34 (general distributional records). Anderson et al., 1993: 40 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (16) AND SPECIMENS (62): **Beni:** 1310/6455, Veinte y Dos, 1 AM; 1320/6408, Magdalena, 2 US; 1339/6426, Estancia El Valle, 1 CBF; 1408/6624, Estancia Espíritu, 4 EBD; 1448/6418, Ibiato, 21 CBF, 15 MNK (not seen, W. Townsend, in litt.); 1451/6621, El Porvenir, 1 EBD; 1451/6621, Totaisal, 1 EBD; 1513/6440, near Loreto, 2 AM; 1516/6444, 6 km N Camiaco, 1 AM; coordinates unknown, San Bernardo on río Sécure, TIPNIS, 1 CBF; coordinates unknown, Laguna Bolivia, TIPNIS, 3 CBF. **Santa Cruz:** 1530/6016, Curiche Grande, on Brazilian border, 3 US; 1727/6340, Buenavista, 2 BM (not seen); 1748/6310, "Santa Cruz" only (coordinates of the city), 3 FM; 1831/5930, San Ramón, Chiquitos (Krumbiegel, 1945: 50); coordinates unknown, Monte Grande near Santa Cruz de la Sierra, (Krumbiegel, 1945: 50). **Department unknown:** perhaps Bolivia, 1 MNLP.

Subgenus (*Odocoileus*) Rafinesque, 1832

Type species *Odocoileus spelaeus* Rafinesque, by monotypy.

Odocoileus virginianus (Zimmermann), 1780

White-tailed Deer, Venado de Cola Blanca

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Dama Virginiana* was described by Zimmermann (1780: 129), type locality "Bewohnt in grossen Heerben Carolina, Virginien, Louisiana, und geht vielleicht bis Panama hinunter"; restricted by Hershkovitz (1948: 43) to "Virginia." *Cervus* (*Coassus*) *peruvianus* was described by Gray (1874: 332); type locality "Ceuchupate, Peru," probably "Combapata, Cuzco" according to Hershkovitz (1948: 45) or "Cosmipata, departamento de Cuzco," Peru, according to Cabrera (1961a: 327). Lydekker (1915: 174) first used the name combination *Odocoileus virginianus peruvianus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in table 174 are of a specimen of the subspecies *O. v. rothschildi* from Panama (AM 18951).

DISTRIBUTIONAL NOTES: The one known locality is noted below and mapped in figure 677.

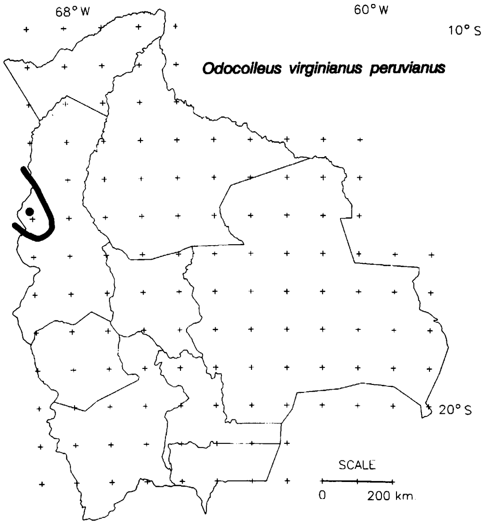


Fig. 677. Localities of known occurrence of *Odocoileus* (*Odocoileus*) *virginianus peruvianus*.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms relevant to Bolivia are:

Odocoileus virginianus peruvianus (Gray, 1874)

Odocoileus virginianus peruvianus: Haltenorth and Trense, 1956: 327 ("Westbolivien"). Jungius, 1974: 374 (photo of antlers at Quello). Smith, 1991: 1 (general biology of species). Anderson, 1993: 34 (general distributional records).

Odocoileus virginianus: Suárez Morales, 1986: 41 (undocumented name in list). Emmons and Feer, 1990: 163 (mentioned Bolivia).

LOCALITIES (1) AND SPECIMENS (0): **La Paz:** 1448/6904, near Pelechuco (Jungius, 1974: 374, "observed on the eastern slopes of the Andes in the Cordillera of Apolobamba between 3,900–4,100 m altitude . . . above the forest limit").

Odocoileus, species not determined

LOCALITIES (4) AND SPECIMENS (5): **Beni:** 1419/6723, near Reyes, 2 US (Mulford Expedition, not seen). **La Paz:** coordinates unknown, Siete Cielos, río Manupare, 1 CBF "venado." **Department unknown:** perhaps Beni, 1 MNK; "Bolivia" only, 1 Paris (no. 825, as *Mazama bezoartica*, not seen).

Subgenus (*Ozotoceros*) Ameghino, 1891

Odocoileus bezoarticus (Linnaeus, 1758)

Pampa Deer, Gama, Guazu-ti, Venado de la Pampa

TAXONOMIC REMARKS: See notes on controversies about generic names under subgenus *Blastocerus*. *Ozotoceros* was considered to be a synonym of *Odocoileus* by Bianchini and Delupi (1979: 89). Some names used for Bolivian specimens have type localities outside of Bolivia. *Cervus Bezoarticus* was described by Linnaeus (1758: 67); type locality "America *australi*" restricted by Thomas (1911c: 151) to "Pernambuco," Brazil. *Cervus leucogaster* was described by Goldfuss (*in* Schreber, 1817: 1127); type locality Paraguay restricted to "Asunción" by Cabrera (1943: 31).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in table 17 are of a young specimen from the Serranía Huanchaca (at MNK).

DISTRIBUTIONAL NOTES: Although many general works have mentioned or mapped eastern Bolivia as within the range of *O. bezoarticus*, I know of no specimen taken prior to 1986. Two older specimens in La Paz (MNLP) may have been taken in Bolivia, but they lack definite locality data. Known localities are listed below and mapped in figure 678.

No Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: A female with one embryo was recorded in August.

CONSERVATION STATUS: Regarded as endangered (CITES, Appendix I).

Scientific synonyms used for Bolivian specimens are:

Odocoileus bezoarticus leucogaster (Goldfuss, 1817)

Odocoileus (*Blastoceros*) *besoarticus*: Krumbiegel, 1945: 60 (mentioned Pampas de Mojos, no specimen).

Odocoileus bezoarticus leucogaster: Cabrera, 1961a: 332 (mentioned "extremo sudeste de Bolivia"). Jackson, 1987: 1 (general summary for the species). Gonzalez et al., 1992: 129 (review of subspecies). Anderson, 1993: 34 (general distributional records).

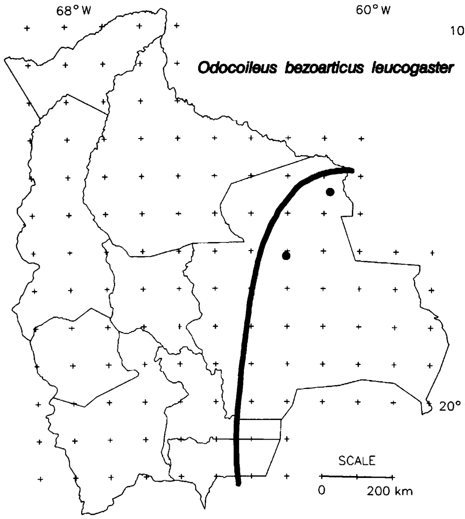


Fig. 678. Localities of known occurrence of *Odocoileus* (*Ozotoceros*) *bezoarticus leucogaster*.

Odocoileus benzoarticus: Suárez Morales, 1986: 41, 121 (undocumented name in list).

Ozotoceros bezoarticus: Tello, 1986: 37 (discussed current status). Parker et al., 1993: 30 (legbone found at hunting camp near río Parapeti on the edge of the Bañados de Izozog). Gonzales et al. *in* Spitz et al., 1992 (discussion of subspecies).

LOCALITIES (2) AND SPECIMENS (5): **Santa Cruz:** 1425/6050, Serrania Huanchaca, 1 EBD, 1 MNK; 1608/6202, near Concepción, 1 MNLP. **Department unknown:** probably Bolivia, 2 MNLP.

FAMILY BOVIDAE GRAY, 1821

SUBFAMILY BOVINAE GRAY, 1821

Genus *Bos* Linnaeus, 1758

Bos taurus Linnaeus, 1758

Cattle, Ganado

TAXONOMIC REMARKS: Zebu cattle, *Bos indicus* of some authors, are regarded as conspecific with *Bos taurus* (Grubb *in* Wilson and Reeder, 1993: 401). Zebus probably have been introduced into Bolivia, but I have no notes to verify this.

Scientific synonyms used for Bolivian specimens are:

Bos Taurus Linnaeus, 1758: 71 (type locality "Poloniae").

Bos taurus: Neveu-Lemaire and Grandidier, 1911: 118 (discussed status of domestic cattle in Bolivia). Mercado and Miralles, 1991: 295 (La Paz Valley).

A brief summary of the effects of grazing animals, both native and introduced, on the vegetation of the Altiplano may be found in papers by Posnansky and Alzerreca (pp. 13–42, *in* Geyger and Arze, 1982). I do not know if there are any feral Bolivian populations of this domestic species. Probably there are feral individuals of this or other domestic bovids, but I have no direct evidence of this.

Specimens, 1. **La Paz:** 1608/6744, Chijchipani, 1 AM.

Measurements in table 17 are of specimens from Colorado (AM 123180) and Georgia (AM 235196), of unknown breeds.

SUBFAMILY CAPRINAE GRAY, 1821

Genus *Capra* Linnaeus, 1758

Capra hircus Linnaeus, 1758

Goat, Cabra

Scientific synonyms used for Bolivian specimens are:

Capra Hircus Linnaeus, 1758: 68 (no type locality given).

Capra hircus: Neveu-Lemaire and Grandidier, 1911: 119 (discussed status of domestic goat in Bolivia).

Specimens, 1. **Chuquisaca:** 2045/6313, Porvenir, 1 AM.

Measurements in table 17 are of the specimen from Porvenir (AM 261367) and one from the zoo (AM 42700).

Genus *Ovis* Linnaeus, 1758

Ovis aries Linnaeus, 1758

Sheep, Oveja

Scientific synonyms used for Bolivian specimens are:

Ovis Aries Linnaeus, 1758: 70 (no type locality given).

Ovis aries: Neveu-Lemaire and Grandidier, 1911: 118 (discussed status of domestic sheep in Bolivia). Mercado and Miralles, 1991: 295 (La Paz Valley).

Specimens, 1. **La Paz:** exact locality unknown, Huacachani, Reserva Ulla Ulla, 1 IE.

Measurements in table 17 are of a zoo specimen (AM 21528).

ORDER RODENTIA BOWDICH, 1821

The rodents are the most speciose order of mammals, rivaled within Bolivia in this respect only by the bats. The families and subfamilies are arranged here as in Wilson and Reeder (1993); genera and species are then arranged alphabetically.

The external measurements included in table 18 were taken as described earlier (Anderson, 1972: 268). The external measurements are: total length, length of tail, length of hind foot, length of ear, weight, and length of head plus body. All measurements are in millimeters except weight, which is in grams. Cranial dimensions that were measured are somewhat different for different groups of rodents and are listed under Sciuridae, Muridae, and Hystricognathi.

SUBORDER SCIUROGNATHI

FAMILY SCIURIDAE HEMPRICH, 1820

The only subfamily represented in Bolivia is the Sciurinae. A genus in addition to *Sciurus*, namely *Microsciurus*, has been reported on the basis of observations, but no Bolivian specimen as yet (see hypothetical list). No Bolivian sciurid is listed as endangered or threatened under CITES.

External measurements are of dimensions noted under Rodentia above. Cranial measurements, taken with hand-held calipers and recorded to the nearest tenth of a millimeter, are of occipitonasal length, interorbital breadth, postorbital breadth, braincase breadth, alveolar maxillary tooth row length, and dental span. These dimensions were measured as noted by Anderson (1972: 268).

Genus *Sciurus* Linnaeus, 1758

Sciurus ignitus (Gray), 1820

The only truly vernacular name is ardilla, the general Spanish term for tree squirrels. Ardilla roja was used by Mares et al. (1989: 148) for *S. ignitus* in Salta, but in Bolivia the other and larger species, *S. spadiceus*, is generally redder than *S. ignitus* and therefore ardilla roja does not seem very appropriate here. Masi chico was used by Arce Pereira et al. (1963: 151), presumably for this species.

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Sciurus* (*Mesosciurus*) *argentinius* was described by Thomas (1921e: 609), type locality Higuerilla, province of Jujuy, Argentina; *Sciurus aestuans* was described by Linnaeus (1766: 88), type locality Surinam. *Sciurus aestuans cuscinus* was described by Thomas (1899: 40), type locality "Ocabamba, Cuzco," Peru.

Color has been used as a diagnostic character within this species. Thomas (1914: 362) stated that *Sciurus cuscinus ochrescens* (= *S. i. ignitus*) differed from *S. cuscinus cuscinus* in having a more ochraceous venter. However, the venter in Bolivian *S. ignitus* ranges from reddish or ochraceous to white. The differences are not clearly geographic or subspecific. The status of the subspecies needs to be studied; the assignments made here are based primarily on geographic grounds rather than on evident differences. Emmons and Feer (1990: 169, following Cabrera, 1961: 371) recognized the "Bolivian squirrel" as *Sciurus ignitus* and considered it to be a species different from *Sciurus aestuans* of northern and far eastern South America. Hoffmann et al. (*in* Wilson and Reeder, 1993: 440) also followed Cabrera's usage. I follow Hoffmann et al., but the question does need further study. Explicit documentation of reasons for taxonomic treatments is lacking in all the references cited.

Morphological Characters and Comparisons: This is the smaller of the two species of tree squirrels recognized in Bolivia. The hind foot of *S. ignitus* is about 50 mm long, compared with about 60 mm in *S. spadiceus*. Dorsal pelage is usually dark reddish brown, rather than the brighter orange-red of *S. spadiceus*.

Parasitology: Fonseca (1960: 130) reported *Bdellonyssus vitzthumi* (Macronyssidae) from Agua Hedionda (2147/6429). The flea, *Polygenis* (*Polygenis*) *bohlsi bohlsi*, was reported from Agua Hedionda (Smit, 1987: 296).

Distributional Notes: Known localities are listed below and mapped in figure 679.

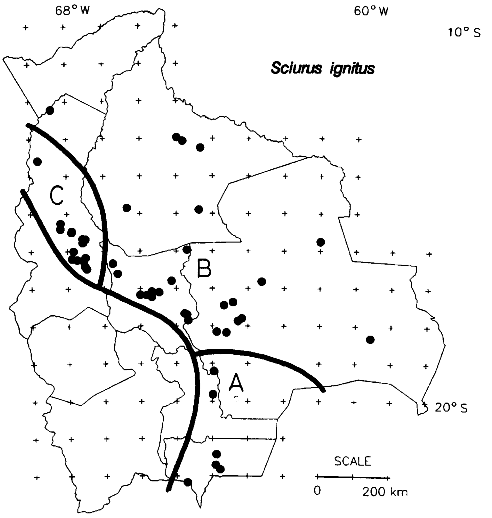


Fig. 679. Localities of known occurrence of three subspecies of *Sciurus ignitus*, *S. i. argentinius* (A), *S. i. boliviensis* (B), and *S. i. ignitus* (C).

Like other *Sciurus*, this species is arboreal and lives where there are trees, but no detailed Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: Two females each had two embryos when taken in August.

Scientific synonyms used for Bolivian specimens are given under subspecies below.

Sciurus ignitus argentinius
Thomas, 1921

Sciurus (*Mesosciurus*) *argentinius*: Thomas, 1925: 577 (Sierra Santa Rosa).

Leptosciurus leucogaster: Fonseca, 1960: 130 (Agua Hedionda). Smit, 1987: 296 (fleas from Agua Hedionda, with *Sciurus ignitus boliviensis* as the current name).

Sciurus ignitus argentinius: Cabrera, 1961a: 370 ("Bolivia" adjacent to northwestern Argentina).

Sciurus aestuans argentius: Anderson, 1985b: 12 (misspelled name in list).

Sciurus aestuans argentinius: Anderson, 1993: 35 (general distributional records).

Sciurus ignitus: Hoffmann et al. *in* Wilson and Reeder, 1993: 441 (restricted *aestuans* to northeastern South America and "Brazil").

Localities (6) and Specimens (13): **Chuquisaca:** 1912/6357, río Azero, 1 ANSP. **Santa Cruz:** 1959/6318, 72 km ESE Monteagudo [Chuquisaca], 1 FM. **Tarija:** 2125/

6353, 108 km ENE Tarija, 1 FM; 2142/6354, Sierra Santa Rosa, Itau, 6 BM; 2149/6346, Caraparí, 3 MACN; 2210/6442, Bermejo, río Bermejo, 1 ANSP.

The two specimens in Philadelphia are reddish but how much this results from post mortum changes is uncertain.

Measurements in tables 18 and 19 are of specimens from río Azero (ANSP 18193), 108 km ENE of Tarija (FM 105939), and río Bermejo (ANSP 18192).

Sciurus ignitus boliviensis Osgood, 1921

Macroxus leucogaster Gray, 1867: 430 (Santa Cruz de la Sierra).

Sciurus aestuans: Burmeister, 1869: 456 (Santa Cruz de la Sierra). Cameron et al, 1989: 69 (observations in western Pando).

Sciurus cuscinus: Thomas, 1902a: 129 (Charuplaya). Neveu-Lemaire and Grandidier, 1911: 8 (Charuplaya).

Leptosciurus leucogaster: Allen, 1915: 207 (province del Sara, río Mapaiso, Santa Cruz de la Sierra, central Bolivia).

Sciurus irroratus ochrescens: Osgood, 1916: 204 (río Chapare, below Todos Santos).

Sciurus ignitus: Osgood, 1916: 204 (Roquefalda).

Sciurus boliviensis Osgood, 1921: 39 (type locality Santa Cruz de la Sierra). Thomas, 1927a: 546 (Santa Cruz de la Sierra).

Guerlinguetus aestuas boliviensis: Arce Pereira et al., 1963: 151 (misspelled name in list; Chipiriri, Todos Santos).

Sciurus aestuans boliviensis: Anderson, 1985b: 12 (name in list). Anderson, 1993: 35 (general distributional records). Anderson et al., 1993: 41 (vicinity of Santa Cruz de la Sierra).

Sciurus ignitus: Hoffmann et al. *in* Wilson and Reeder, 1993: 441 (restricted *aestuans* to northeastern South America and "Brazil").

Localities (36) and Specimens (102): **Beni:** 1258/6459, Azunta, 1 FM; 1304/6449, San Joaquín, 1 FM; 1315/6420, Piedras Blancas, 1 MNK; 1451/6621, Totaisal, 1 km SW of Estación Biológica del Beni, 1 AM; 1454/6422, 6 km W of Casarabe, 1 AM. **Cochabamba:** 1558/6442, mouth of río Chapare, 1 ANSP; 1636/6637, Charuplaya, also spelled Charumplaya, 2 BM; 1620/6645, Yungas de Cochabamba, 6 BM, 7 CM, 1 FM, 3 UMMZ; 1648/6508, río Chapare, below Todos Santos, 1 FM; 1648/6508, Todos Santos, 1 AM; 1700/6550, Yungas de Cochabamba (Miller and Boyle), 1 AM; 1705/6541, 60 km [SW of] Villa Tunari, 1 EBD; 1706/6529, Yungas, Palmar, 7 ANSP; 1706/6529, Alto Palmar, province of Chapare, 3 AM; 1706/6529, El Palmar, 2 MACN; 1710/6544, San Jacinto, 1 ANSP; 1710/6600, Roquefalda, 1 FM; 1711/6548, Locatal, 3 AM; 1711/6549, Chapare, 2 FM, 5 UMMZ, 1 BM; 1714/6541, Incachaca, 3 AM, 2 ANSP, 2 BM, 4 CM, 2 FM; 1740/6446, Carahuasi, 1 IML; 1742/6442, San Mateo, 1 AM; 1751/6440, 25 km by road W Comarapa, 1 UMMZ; coordinates unknown, San Cristobal, 1 ANSP. **Pando:** 1213/6824, Santa Rosa, 1 MSB. **Santa Cruz:** 1545/6100, Los Palmares, 2 MNK; 1649/6237, Palmarito, río San Julián, 2 CM; 1722/6325, province del Sara, 2 CM; coordinates unknown, Cerro Hosana, 2 CM; 1727/6340, Buenavista, 3 CM, 1 UMMZ, 4 BM; 1748/6310, Santa Cruz de la Sierra, 2 BM, 1 CM; 1752/6317, río Mapaiso, 1 CM; 1809/6352, Samaipata, 5 ANSP; 1810/6336, Vermejo, 1 AM; 1819/5934, Santiago, province of Chiquitos, 1 FM; coordinates unknown, Tipoy, 1 MNK. **Department unknown:** "Central Bolivia," 1 BM (Allen, 1915); "Bolivia," 1 BM.

Measurements in tables 18 and 19 are of specimens from Samaipata (ANSP 19320–19324).

Sciurus ignitus ignitus (Gray), 1867

Macroxus ignitus Gray, 1867: 249 (type locality Bolivia, restricted to "Yungas, upper Rio Beni" [in La Paz] by Allen, 1915: 205).

Sciurus cuscinus ochrescens Thomas, 1914: 362 (type locality "Astillero, 67° W, 16° S. Alt. 2700 m").

Leptosciurus ignitus ignitus: Allen, 1915a: 205 (Astillero, Yungas, San Carlos, San Ernesto).

Leptosciurus leucogaster: Allen, 1915a: 209 (Chulumani).

Sciurus aestuans ignitus: Anderson, 1985b: 12 (name in list). Anderson, 1993: 35 (general distributional records).

Sciurus ignitus: Emmons, 1991: 72 (Alto río Madidi). Hoffmann in Wilson and Reeder, 1993: 441 (restricted *aestuans* to northeastern South America).

Localities (17) and Specimens (34): **La Paz:** 1335/6846, Moira Camp, Alto río Madidi, 1 CBF; 1515/6810, Mapiri, 2 AM, 4 BM;

1515/6810, San Ernesto, 3 BM; 1524/6811, San Carlos, 2 BM; 1528/6752, Huanay, río Mapiri, 2 ANSP; 1530/6753, Chimasi, 1 BM; 1540/6735, 35 km by road N Caranavi, Serranía Bellavista, 3 AM; 1541/6730, Serranía Bella Vista, 1525 m, 1 AM; 1546/6734, 5 km E Caranavi, 1 MSU; 1546/6735, 2 km E Caranavi, [province of] Nor Yungas, 1 EBD; 1600/6750, Calabatea, Yungas, 1 ANSP; 1610/6730, Yungas, 2 AM, 2 BM; 1612/6752, Sandillani, Yungas, 1 ANSP; 1614/6744, Yolosito, 2 AM; 1616/6733, Astillero, 3 BM; 1624/6731, Chulumani, 1 BM; 1628/6728, Irupana, 1 IE.

Measurements in tables 18 and 19 are of specimens from Mapiri (AM 36490, 72586, BM 01.1.1.58 to 61) and N of Caranavi (AM 246662–246664).

Sciurus ignitus, subspecies not determined

Localities (2) and Specimens (6): **Department unknown:** "Central Bolivia," 2 BM; "Bolivia," 4 BM.

Sciurus spadiceus Olfers *in* Eschwege, 1818

The only truly vernacular name is ardilla, the general Spanish term for tree squirrels. In view of the comments under *S. ignitus* above, ardilla roja grande might be appropriate for *S. spadiceus*.

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Sciurus spadiceus* was described by Olfers (*in* Eschwege, 1818: 208); type locality "Brazil" restricted by Hershkovitz (1959a: 346) to Cuyaba in Mato Grosso. *Sciurus igniventris* was described by Wagner (1842: 360), type locality Marabitanos, rio Negro, Amazonas, Brazil. *Sciurus langsdorfii* was described by Brandt (1835: 425); type locality "Brasilia" restricted by Wagner to Cuyaba, Matto Grosso (see Allen, 1915: 277). *Sciurus tricolor* was described by Tschudi (1844: 156), type locality Maynas, Peru. *Sciurus pyrrhonotus* was described by Wagner (1842b: 360), type locality Borba, Amazonas, Brazil. Hershkovitz (1959a: 346) synonymized *pyrrhonotus* and *langsdorfii* with *spadiceus*. Geographic differences worthy of subspecific recognition may exist within Bolivia, but no one has examined the question closely. For the present, I list all specimens under the species name only.

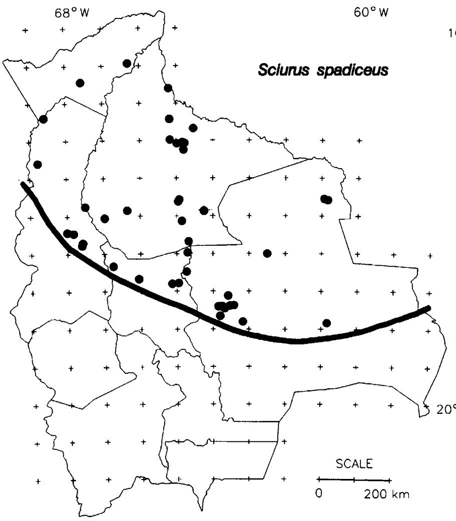


Fig. 680. Localities of known occurrence of *Sciurus spadiceus*.

Morphological Characters and Comparisons: Measurements in tables 18 and 19 are of specimens from 6 km S of Buena Hora (AM 211694), río Mamoré at 12°26′S (AM 211685), río Mamoré at 12°59′S (AM 211684), río Machupo (FM 96177), 20 km S of San Joaquín (AM 211687, 211688, 211690), 23 km W of San Javier (AM 211693), 54 km S of mouth of río Chapare (AM 211695—211697), and 7 km N and 17 km W of Buenavista (AM 246665). Data for eight specimens from Ibiato that are included in the 16 from Beni in table 18 are from W. Townsend (in litt.).

Distributional Notes: Like other *Sciurus* this species is arboreal and lives where there are trees. Known localities are listed below and mapped in figure 680.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: Two females each had two embryos when taken in August.

Scientific synonyms used for Bolivian specimens are:

Sciurus igniventris: d'Orbigny and Gervais, 1847: 24 (Chiquitos; not *S. igniventris* Natterer *in* Wagner, 1842b: 360, according to Hershkovitz, 1987b: 75).

Sciurus langsdorfii: Gerrard, 1862: 214 (one from "Bolivia," Bridges's coll.).

Sciurus tricolor: Burmeister, 1869: 456 (Santa Cruz de la Sierra, may have referred to this species).

Sciurus pyrrhonotus: Thomas, 1900c: 139 (Yungas and Misiones, upper Mamoré). Pilleri, 1977: 47 (name in list).

Sciurus castus Thomas, 1903a: 488 (type locality Chimate). Neveu-Lemaire and Grandidier, 1911: 8 (Chimate).

Sciurus langsdorfii steinbachi Allen, 1914: 596 (type locality "Santa Cruz de la Sierra").

Urosciurus pyrrhonotus castus: Allen, 1915: 276 (Yungas).

Urosciurus langsdorfii steinbachi: Allen, 1915a: 279 (Santa Cruz de la Sierra).

Sciurus spadiceus: Patton, 1984: 71. Cameron et al, 1989: 69 (observations in western Pando). Emmons and Feer, 1990: 168 (mentioned Bolivia). Emmons, 1991: 72 (Alto río Madidi). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Hoffmann *in* Wilson and Reeder, 1993: 442 (use of name). Anderson, 1993: 35 (general distributional records). Anderson et al., 1993: 41 (vicinity of Santa Cruz de la Sierra).

Sciurus langsdorffi steinbachi: Cabrera, 1961a: 377 (Santa Cruz de la Sierra).

Sciurus pyrrhonotus castus: Cabrera, 1961a: 378 (Chimate).

Sciurus Langsdorffi steinbachi: Arce Pereira et al., 1963: 151 (name in list; Chipiriri, Todos Santos).

Sciurus spadiceus castus: Anderson, 1985b: 12 (name in list).

Sciuridae: Stearman, 1990: 380 (10 squirrels were reported; I saw one specimen of the species *S. spadiceus*; Yuquí camp at 1647/6457).

LOCALITIES (48) AND SPECIMENS (183): **Beni:** 1136/6512, 6 km S Buena Hora [Brazil], 1 AM; 1226/6511, río Mamoré, 1 AM; 1241/6432, 15 km above Horquilla on río Machupo, 1 AM; 1259/6510, río Mamoré, 1 AM; 1303/6450, 5 km N San Joaquín, Aguadulce, 2 FM; 1304/6449, San Joaquín, 2 FM; 1304/6446, 5 km E San Joaquín, río Machupo, 2 FM; 1305/6459, San Pablo, 1 FM; 1315/6448, Estancia Yutiole, 24 AM; 1330/? , El Bato, río Negro, 2 IML; 1434/6455, 23 km W San Javier, 1 AM; 1437/6457, mouth of río Ibare, 6 AM; 1448/6418, Ibiato, 4 CBF, 4 MNK (not seen, W. Townsend, in litt.); 1451/6621, Reserva Biológica del Beni, La Cabaña, 2 EBD; 1503/6658, 1 km E La Embocada, 1 UMMZ; 1508/6451, río Mamoré, 10 km E San Antonio, 1 AM; 1540/6440, río Mamoré, Marbán, 1 MACN. **Cochabamba:** 1558/6442, mouth of río Chapare, 3 ANSP; 1620/6645, Yungas, upper Mamoré, (Thomas, 1900c); 1640/6603, Mosetenes, 1 BM; 1647/6457, Campamento Yuqui, 1 MNLP; 1648/6508, Todos Santos, 2 AM, 2 ANSP. **La Paz:** 1335/6846, Moira Camp, [province of] Iturralde, Alto río Madidi, 1 CBF; 1445/6730, río Quiquibey, 1 MNLP; 1525/6800, Chimate, 1 BM; 1527/6750, Santa Ana, río Coroico, 2 ANSP; 1542/6735, 20 km NNE Caranavi, 1 UMMZ; 1546/6736, Caranavi, 9 MSU; coordinates unknown, "Yungas" perhaps, 1 MSB. **Pando:** 1056/6618, Remanso, 1 CBF; 1126/6734, Independencia, 1 AM; 1223/6835, Chivé, 1 AM. **Santa Cruz:** 1433/6056, Los Fierros, 1 US?; 1435/6050, Los Fierros, 1 EBD; 1600/6230, Totaitu, 1 MNK; 1629/6444, 54 km S of mouth of río Chapare, on río Ichilo, 3 AM; 1707/6335, near Santa Rosa, 1 MSB; 1722/6325, province of Sara, 4 BM; 1722/6325, río Surutú, province of Sara, 1 AM, 2 ANSP, 1 BM, 1 CM; 1723/6332, San Miguel Rincón, 1 AM, 1 CBF, 1 MSB; 1724/6344, 7 km N and 17 km W Buenavista, 1 AM; 1724/6346, río Yapacaní, 1 FM, 1 US; 1724/6351, río Surutá, 4 MACN (not seen); coordinates unknown, Cerro Hosana, 4 CM; 1727/6340, Buenavista, 2 ANSP, 10 BM, 8 FM (3 not seen), 10 MACN, 11 UMMZ; 1739/6348, Parque Nacional Amboró, 1 EBD; 1748/6310, Santa Cruz de la Sierra, 6 CM, 1 FM; 1750/6050, San José de los Chiquitos, 1 IML; locality unknown, 1 MNK. **Department unknown:** "Central Bolivia" only, 1 BM; "Bolivia" only, 2 BM; perhaps Bolivia, 5 MNLP.

Sciurus, species not determined

LOCALITIES (8) AND SPECIMENS (28): **Beni:** 1540/6440, río Mamoré, Marbán, 1 MACN (not seen). **Cochabamba:** 1643/6449, río Chimoré, 3 CBF; 1647/6457, Campamento Yuqui, 1 MNLP; 1706/6529, El Palmar, 2 MACN (not seen). **La Paz:** 1545/6731, 1 km S of La Reserva, 1 CBF. **Santa Cruz:** 1727/6340, Buena Vista, 10 MACN (not seen); coordinates unknown, Nueva Moka, 6 MACN (not seen). **Tarija:** 2149/6346, Caraparí, 3

MACN (not seen). **Department unknown:** "Bolivia," 1 MACN (not seen).

FAMILY MURIDAE GRAY, 1821

All native Bolivian murids are Sigmodontinae; the introduced murids from the Old World are Murinae. The use of Cricetidae for New World myomorphs persists to some degree through the weight of tradition although taxonomists who have considered the classification of rodents at the ordinal and familial levels generally agree that Cricetinae should be restricted to the Old World hamsters. However, many problems remain in regard to possible phylogenetic relationships among families of rodents (see Musser and Carleton *in* Wilson and Reeder, 1993: 501, and references therein).

Most species of rats and mice do not have unique vernacular names. The terms "rata" and "raton" are commonly used in Spanish, just as rat and mouse are in English, for larger and smaller myomorph rodents, respectively. I note some vernacular names but see no real value in attempting to propose names or to cite all published common names for species that occur in Bolivia.

No Bolivian murid is listed as endangered or threatened under CITES.

External measurements in table 18 are those listed at the beginning of the account of Rodentia. Cranial measurements were taken with a stage craniometer and are rounded to the nearest tenth of a millimeter. Measurements are occipitonasal length, alveolar length of upper maxillary tooth row, length of rostrum, breadth of braincase, postdental breadth, posterior zygomatic breadth, breadth of M1, and interorbital breadth (all as defined by Anderson, 1969).

SUBFAMILY MURINAE GRAY, 1821

Genus *Mus* Linnaeus, 1758

Mus musculus Linnaeus, 1758

House Mouse, Raton de la Casa

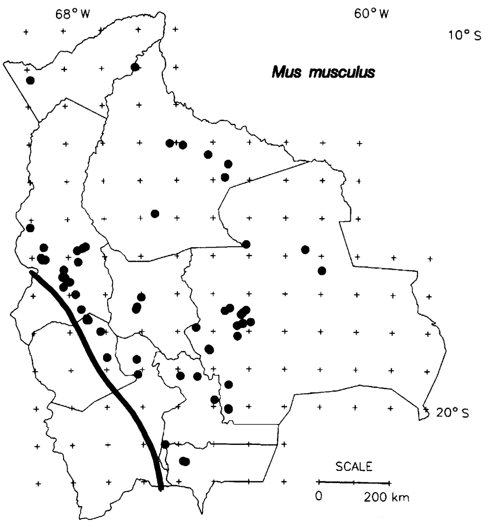


Fig. 681. Localities of known occurrence of *Mus musculus.*

TAXONOMIC REMARKS: *Mus Musculus* was described by Linnaeus (1758: 62); type locality not given, restricted by Thomas (1911c: 147) to Uppsala, Sweden. The taxonomy of this Old World species, now widely introduced wherever people have gone on all continents, continues to warrant study. Some authors have suggested that more than one species are present in the complex. No attempt has been made to compare Bolivian material with material from other parts of the world or to consider whether subspecies recognition is warranted. See summary by Musser and Carleton (*in* Wilson and Reeder, 1993: 626).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from near Pocoata (AM 255995–256005) and Caracato (AM 249034–249035, 249039–249040).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 681.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

PARASITOLOGY: The flea *Xenopsylla cheopsis* was reported from Santa Cruz de la Sierra (Hopkins and Rothschild, 1953: 259).

REPRODUCTION: A female with four embryos was taken in July; three females without embryos were also recorded in July.

Scientific synonyms relevant to Bolivian specimens are:

Mus musculus: Thomas, 1898b: 3 (Bolivia or Argentina, exact locality not given). Hopkins and Rothschild, 1953: 259 (fleas from Santa Cruz de la Sierra). Yoneda, 1984b: 12 (Collana). Anderson, 1985b: 14 (name in list). Patterson,

1992: 30 (Illataco, Sorata). Anderson, 1993: 49 (general distributional records). Anderson et al., 1993: 46 (vicinity of Santa Cruz de la Sierra).
Mus domesticus: Mercado and Miralles, 1991: 295 (La Paz Valley).

LOCALITIES (66) AND SPECIMENS (731): **Beni:** 1059/6606, Riberalta, 4 US; 1301/6511, Santa Rosa, 46 FM; 1304/6449, San Joaquín, 15 FM, 42 US; 1320/6408, Magdalena, 29 FM, 70 US; 1335/6335, Baures, 21 FM, 5 US; 1356/6340, El Carmen, 28 FM; 1453/6536, San Ignacio, province of Moxos, 1 US, 4 Oklahoma State Univ. (not seen); coordinates unknown, Alto Beni?, 10 AM. **Chuquisaca:** 1911/6456, Tarabuco, 6 AM; 1912/6427, 11 km N and 16 km W of Padilla, 1 AM, 3 MNLP; 1949/6358, 2 km SW of Monteagudo, 1130 m, 3 AM; 2100/6523, Finca San Antonio, 1 EBD. **Cochabamba:** 1705/6600, Tablas Monte, 1 MSB; 1720/6607, Illataco, 2 (Patterson, 1992: 30); 1724/6609, Cochabamba, 1 AM, 3 MACN (not seen), plus 14 others from owl pellets in a collection in La Paz; 1724/6609, Cochabamba (assumed to be the city), 2 FM. **La Paz:** 1512/6902, Charazani, 6 AM; 1544/6731, La Reserva, 840 m elevation, 1 AM; 1544/6840, Sorata, Mt. Illampu, 3 (Patterson, 1992: 30); 1546/6736, Caranavi, 1 AM, 18 MSU; 1550/6745, río Zongo, 1500 m elevation, 2 AM; 1600/6845, Hacienda Poccata N of Achacachi, 2 US; 1603/6843, Achacachi, 5 US; 1603/6838, 10 km E Achacachi, 2 UMMZ; 1608/6744, Chijchipani, 4 AM, 2 MSB; 1620/6808, Mount Chacaltaya, 4 UMMZ; 1630/6809, La Paz, 21 AM, 3 IE (La Paz), 4 MNLP; 1631/6810, El Alto, Villa Adela, 1 IE; 1632/6806, Calacoto, 12 IE; 1633/6806, San Miguel, 1 MNLP; 1639/6758, Collana, 1 MNLP; 1647/6809, 20 mi [= 32 km] S La Paz, 1 MVZ; 1659/6749, Caracato, 8 AM; 1723/6740, Lahuachaca, 1 IE. **Oruro:** 1737/6731, Huancaroma, 60 km N Oruro, 1 UMMZ; 1740/6729, Huancaroma, 2 AM; 1740/6731, 9 km S Eucaliptus, 2 AM; 1759/6709, Oruro (assumed to be city of), 11 AM; 1840/6659, 10 km by road SW Pazña, 1 UMMZ; 1908/6607, 7 km S and 4 km E of Cruce Ventilla, 1 AM. **Pando:** 1117/6855, río Nareuda, 3 AM. **Potosí:** 1844/6609, 3 km SE of Pocoata, 12 AM. **Santa Cruz:** 1542/6305, Ascensión de Guarayos, 10 US, 45 FM; 1550/6127, Santa Rosa de la Roca, 1 MSB; 1623/6059, San Ignacio, 58 US; 1723/6332, San Miguel Rincón, 1 AM; 1726/6305, Las Barreras, 4 US; 1727/6340, Buenavista, 1 UMMZ, 6 MACN (not seen); 1730/6310, Warnes, 10 US; 1733/6313, La Belgica, 1 MNK; 1745/6257, Cotoca, 3 US; 1747/6310, Santa Cruz Zoo, 1 MNK; 1748/6310, Santa Cruz, 5 CM, 47 US; 1748/6310, Santa Cruz de la Sierra, 1 CM, 2 MNK; 1751/6320, Ayacucho, 17 US; 1754/6429, Comarapa, 1 BM; 1808/6319, Basilio, 1 MNK; 1828/6408, 5.5 km by road NNE of Vallegrande (río Cienega), 1 MSB; 1830/6406, Valle Grande, 5 MNK; 1925/6334, Gutierrez, 4 US; 2003/6335, Choreti, 4 US; 2005/6334, Camiri, 24 US; coordinates unknown, Andrés Ibáñez province, 6 MNK. **Tarija:** 2127/6452, Serranía Sama, 1 MSB; 2128/6448, Erquis, 4 AM, 2 CBF. **Department unknown:** coordinates unknown, São Antonnio, rio Guaporé, 1 CM; "Bolivia" only, 2 AM, 1 US, 3 MACN (not seen); "Bolivia or Argentina," 16 or more, BM (Thomas, 1898).

Genus *Rattus* Fischer, 1803

It is noteworthy that no specimen of *Rattus norvegicus* has been identified from Bolivia, other than laboratory rats.

Rattus rattus (Linnaeus), 1758

Black Rat, Roof Rat

TAXONOMIC REMARKS: *Mus Rattus* was described by Linnaeus (1758: 61); type locality "Europae" restricted by Thomas, 1911c: 147, to Uppsala, Sweden. *Rattus rattus*, like *Mus musculus*, is an Old World species widely introduced in other parts of the world. No attempt has been made here to evaluate or assign subspecific names to the Bolivian populations. See the discussion of the history of taxonomy of *Rattus rattus* by Musser and Carleton (*in* Wilson and Reeder, 1993: 658).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from 1447/6451 (AM 255983), 1723/6332 (AM 260773, 260774), 1724/6344 (AM 246948), and 1428/6734 (AM 247892).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 682.

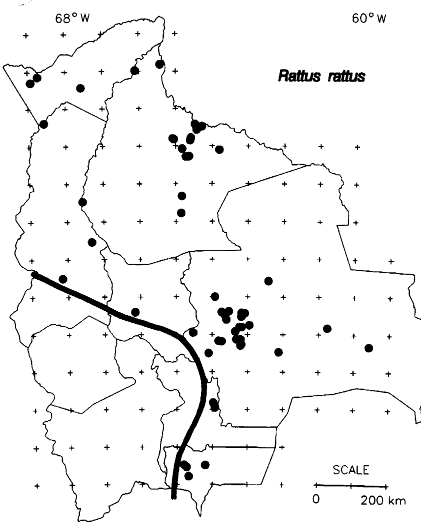


Fig. 682. Localities of known occurrence of *Rattus rattus*.

HABITAT: Lives commensally in human habitations but also in feral populations.

No detailed study has been made in Bolivia of habits behavior, or food.

PARASITOLOGY: Fonseca (1960: 93) reported an ixodid tick, *Amblyomma* sp., from "*Rattus alexandrinus*" from Charagua (1948/6313) in Santa Cruz. Two species of fleas have been reported: *Neotyphloceras crassispina hemisus* from Padilla (Hopkins and Rothschild, 1966: 136), and *Polygenis* (*Polygenis*) *tripus* from Los Pozos (Smit, 1987: 303). I have not seen voucher specimens of the host.

REPRODUCTION: Two females were recorded as without embryos in July and in August; no other data available. Dr. Maria de Marconi told me that the species does not reproduce at the elevation of La Paz and the Altiplano. I am not aware of any published report of an inhibiting effect of elevation on rat reproduction, but have not made an extensive search of the literature either. The one specimen from "La Paz" in the list below is CBF 1223. It was obtained on 19 November 1987. The collector is not recorded. It is possible that it came from some lower elevation in the department of La Paz and not from the city itself.

Scientific synonyms used for Bolivian specimens are:

Mus rattus: Thomas, 1898b: 3 (Bolivia or Argentina, no exact locality given).
Rattus alexandrinus: Fonseca, 1960: 93 (ectoparasites, Charagua).
Rattus rattus alexandrinus: Hopkins and Rothschild, 1966: 136 (fleas from Padilla). Smit, 1987: 303 (fleas from Gutierrez).
Rattus rattus: Anderson, 1985b: 13 (name in list). Anderson, 1993: 49 (general distributional records). Anderson et al., 1993: 46 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (57) AND SPECIMENS (328): **Beni:** 1049/6525, Guayaramerin, 22 AM; 1059/6606, Riberalta, 15 US; 1225/6428, bank of río Iténez opposite Principe da Beira [Brazil], 2 AM; 1229/6417, bank of río Iténez opposite Costa Marques [Brazil], 1 AM; 1234/6425, Horquilla, 19 FM; 1247/6435, Las Peñitas, 12 US; 1248/6505, Puerto Siles, 1 FM; 1249/6503, Cinco, or km 5 on road Puerto Siles to San Joaquín, 20 FM; 1251/6436, La Esperanza, 4 US; 1304/6449, San Joaquín, 7 FM, 1 US; 1306/6348, Buenavista, 12 FM; 1316/6438, San Ramón, 11 MSB; 1317/6443, San Ramón, 65 FM; 1420/6450, San Pedro, 1 FM; 1428/6734, Rurrenabaque, 4 AM, 2 IE; 1447/6451, Puerto Almacen, 2 AM. **Chuquisaca:** 1949/6358, 2 km SW of Monteagudo, 1 MNLP, 2 MSB; 1957/6355, Pucamayo, in valley of río Bañado, 1 FM; coordinates unknown, Atolladar, in valley of río Bañado, 1 FM. **Cochabamba:** 1724/6609, Cochabamba, 1 AM, plus one other from owl pellet in La Paz. **La Paz:** 1532/6720, Sapecho, 1 CBF; 1630/6809, La Paz, 1 IE; **Pando:** 1108/6844, 10 km S Cobija, 9 US; 1117/6855, río Nareuda, 7 AM, 1 IE; 1126/6734, Independencia, 1 AM, 1 MSB; 1223/6835, Chivé, 3 MNLP. **Santa Cruz:** 1635/6225, San Ramón, Castedo, 2 MNK; 1700/6355, Ayacucho, 3 AM, 1 CENETROP, 1 MNK; 1723/6332, San Miguel Rincón, 2 AM; 1724/6344, 7 km N and 17 km W Buenavista, 2 AM; 1725/6310, Juan Latino, 13 km NNW Warnes, 1 US; 1726/6305, Las Barreras, 11 km NE Warnes, 1 US; 1727/6340, Buenavista, 2 BM; 1730/6310, Warnes, 7 US; 1731/6311, 3 km SW Warnes, Santa Rosita, 4 US; 1736/6336, San Rafael de Amboró, 1 AM, 1 MSB; 1745/6257, Cotoca, 1 AM, 1 US; 1748/6310, Santa Cruz, 1 MNK, 2 MSU, 13 US, plus 3 from owl pellets in a collection in La Paz; 1748/6310, Santa Cruz de la Sierra, 1 CM; 1749/6045, San José, province of Chiquitos, 2 US; 1748/6314, Km 7.5 on road to Cochabamba, 2 AM; 1755/6321, Km 21 on road to Cochabamba, 2 AM; 1757/6432, 5 km SW of Comarapa, 1 AM; 1808/6312, 7 km E and 3 km N Ingeniero Mora, 5 AM; 1808/6319, Basilio, 3 MNK; 1810/6349, 3 km E of Samaipata, 1 MNK; 1811/6344, 1 km NE Estancia Cuevas, 1 AM; 1816/6311, 3 km N of Zanja Honda, Hacienda El Pelícano, 1 AM; 1818/6312, Zanja Honda, 1 MNK; 1819/5934, Santiago, province of Chiquitos, 4 FM; 1828/6207, 8 km SE of Tita, 1 MSB; 1830/6406, Valle Grande, 4 MNK; coordinates unknown, Los Huesos, province of Cordillera, 2 US. **Tarija:** 2128/6448, Erquis, 3 AM, 2 MSB; 2129/6412, 5 km NNW of Entre Ríos, 1 AM, 3 CBF, 2 MSB; 2132/6444, Ciudad Tarija, 1 AM, 1 MACN (not seen); 2147/6440, 11.5 km N and 5.5 km E of Padcaya, 1 MSB. **Department unknown:** "Bolivia or Argentina", 1 BM (Thomas, 1898b).

SUBFAMILY SIGMODONTINAE WAGNER *IN* SCHREBER, 1843

Taxonomic Remarks: As used here, tribes represented in Bolivia are Oryzomyini, Akodontini, Scapteromyini, Phyllotini, Sigmodontini, and Ichthyomyini. For an outline of the history, complications, and diverse views of relationships within Sigmodontinae see Musser and Carleton (*in* Wilson and Reeder, 1993: 687; and Steppan, 1995: 62). Steppan nearly removed the genus *Sigmodon* from the Sigmodontinae, which would necessitate a change in the subfamily name, if done. He wrote "*Holochilus* should be removed from the Sigmodontini, leaving only *Sigmodon*.×. . . Thus, if Sigmodontini is retained as a separate tribe, it should be considered Sigmodontinae *incertae sedis*, or even Muridae *incertae sedis*" (Steppan, 1995: 62). Perhaps the concept of incertae sedis is misused here. If the tribe is retained and placed in Sigmodontinae then the tribe has certainly been placed, regardless of the confidence one may have in that placement. If the tribe is retained and there is uncertainty as to what subfamily it should be placed within, then it may be considered as Muridae incertae sedis.

TRIBE ORYZOMYINI VORONTSOV, 1959

Taxonomic Remarks: Genera represented in Bolivia are: *Microryzomys*, *Neacomys*, *Nectomys*, *Oecomys*, *Oligoryzomys*, *Oryzomys*, *Rhipidomys*, and *Thomasomys*. Four of these have been treated as subgenera of *Oryzomys* by many authors. *Rhipidomys* and *Thomasomys* have been placed by some authors in a Tribe Thomasomyini. Steppan (1995: 60) included the tetralophodont genera *Holochilus*, *Pseudoryzomys*, and *Zygodontomys* in the Oryzomyini, but excluded the thomasomyines.

Genus *Microryzomys* Thomas, 1917

Taxonomic Remarks: In the tribe, only this genus has been critically revised recently (Carleton and Musser, 1989); all of the others need such revision. In a study of proteins by electrophoresis, *Microryzomys* was placed as a sister group to *Oligoryzomys* and *Neacomys* (Dickerman and Yates, 1995: 182).

Microryzomys minutus (Tomes), 1860

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Hesperomys minutus* was described by Tomes (1860: 215), type locality Pallatanga, province of Chimborazo, 1485 m elevation, Ecuador.

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from 25 km W Comarapa (UM 155892, 156216–156228) and the río Aceramarca (AM 72733).

Distributional Notes: Known localities, all in the Yungas, are listed below and mapped in figure 683.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Oryzomys (*Microryzomys*) *minutus*: Anderson, 1985b: 12 (name in list).

Microryzomys minutus: Carleton and Musser, 1989: 3 (La Paz and Santa Cruz departments). Anderson, 1993: 35 (general distributional records). Dickerman and Yates, 1995: 188 (1751/6442, not 6542 as cited).

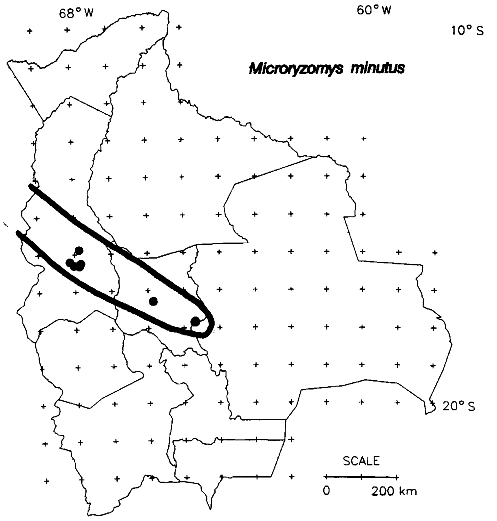


Fig. 683. Localities of known occurrence of *Microryzomys minutus*.

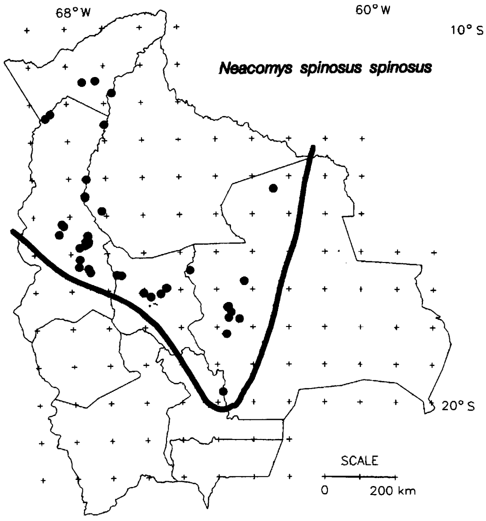


Fig. 684. Localities of known occurrence of *Neacomys spinosus spinosus*.

LOCALITIES (10) AND SPECIMENS (28): **Cochabamba:** 1713/6552, Corani, 1 MSB; 1751/6440, 25 km W of Comarapa, Siberia, 14 UMMZ; 1751/6442, 31 km by road W of Comarapa, 1 AM (skull of AM 260419 figured by Carleton and Musser, 1989: 29). **La Paz:** 1553/6752, 3 km N of Zongo, 1 UMMZ; 1612/6808, Lago Viscachani, 1 MSB; 1615/6750, 15 km NE of Unduavi, 1 UMMZ; 1619/6753, río Aceromarca (one of the variant spellings on labels), 1 MSB; 1618/6801, río Aceramarca, 1 km S of Yerbani, 5 UMMZ, 1 AM; 1619/6752, Ñequejahuira, 1 AM. **Santa Cruz:** 1749/6441, Serranía Siberia, 11 km by road NW of Torrecillas, 1 AMNH.

Genus *Neacomys* Thomas, 1900

TAXONOMIC REMARKS: *Neacomys* lies cladistically within an *Oryzomys* complex and as a sister-group to *Oligoryzomys*, based on electrophoretic study (Dickerman and Yates, 1995: 182).

Neacomys spinosus spinosus (Thomas, 1882)

Spiny Mouse or Raton Espinoso are possible vernacular names.

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Hesperomys* (*Calomys*) *spinosus* was described by Thomas (1882: 105), type locality Huambo, department of Amazonas, Peru. Another larger (but as yet undescribed) species of *Neacomys* is known from Peru and may eventually be discovered in Bolivia.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from 35 km N of Caranavi (AM 246936–246940), Isla Gargantua (AM 262822), and La Cruz (AM 262824).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 684.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

PARASITOLOGY: A flea, *Polygenis* (*Polygenis*) *atopus*, was reported from "*Euryzygomatomys spinosus*" from Floripondio by Smit (1987: 270), but that species is not known from Bolivia or anywhere near Bolivia. Another flea, *Polygenis* (*Polygenis*) *roberti beebei*, was likewise reported from "*Euryzygomatomys spinosus*" from Floripondio (Smit, 1987: 281). Perhaps the host is *Neacomys spinosus*, but no voucher specimen has been seen and the identity remains uncertain.

REPRODUCTION: Five females taken in July had no embryos. Embryos were present in May and October, numbers of embryos (and of females with the number noted) were 2 (1), 3 (2), 4 (1), 5 (1). A juvenile individual was recorded in October.

Scientific synonyms used for Bolivian specimens are:

Neacomys spinosus: Thomas, 1902a: 131 (Charuplaya). Neveu-Lemaire and Grandidier, 1911: 10 (Charuplaya, Mapiri). Dickerman and Yates, 1995: 188 (San Rafael de Amboró, 1736/6336; 3 km S of Rurrenabaque, 1430/6734; Isla Gargantua, 1223/6835; La Cruz, 1124/6713). Steppan, 1995: 110 (AM 261987, 261989–261991, 263815).

Neacomys spinosus spinosus: Anderson, 1985b: 12 (name in list). Anderson, 1993: 36 (general distributional records). Anderson et al., 1993: 43 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (43) AND SPECIMENS (124): **Beni:** 1144/6647, boca del río Biata, 1 AM; 1428/6734, Rurrenabaque, 1 AM; 1430/6734, 3 km S of Rurrenabaque, 2 AM, 1 MSB; 1452/6707, Km 35 NW of Yucumo, 1 MSB; coordinates unknown, río Beni, 4 AM. **Chuquisaca:** 1943/6351, 2 km E of Chuhuayaco, 1 AM. **Cochabamba:** 1635/6645, Seque Rancho on río Cotacajes, 1 CBF; 1636/6637, Charuplaya, 2 BM; 1657/6523, 2 km E Villa Tunari, 3 AM; 1657/6524, 0.5 km NE Villa Tunari, 2 UMMZ; 1702/6559, 9.5 km NE of Tablada Monte, 4 AM, 2 CBF, 1 MSB; 1704/6601, 4.4 km by road N of Tablas Monte, 3 AM, 7 CBF, 7 MSB; 1706/6533, El Palmar, río Cochi Mayu, 4 AM, 1 MSB; 1711/6549, Chapare, 1 BM. **La Paz:** 1234/6700, río Madidi, 8 km from mouth, 2 MSB; 1401/6731, río Beni, 2 AM; 1512/6813, 10 km by road NW of Mapiri, 2 UMMZ; 1515/6810, Mapiri, 1 AM, 1 BM; 1528/6818, Ticunhuaya, 4 AM; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 1 TTU; 1540/6735, 35 km by road N Caranavi, Serranía Bella Vista, 5 AM; 1541/6730, Serranía Bella Vista, 1525 m elevation, 5 AMNH; 1543/6731, La Reserva, 950 m elevation, 2 AMNH, 4 CBF, 4 MSB; 1546/6736, Caranavi, 1 MSU; 1550/6745, río Zongo, 1500 m elevation, 1 AM; 1609/6745, Chijchijpa, 1 MSB; 1621/6747, Pitiguaya, 1 AM; 1624/6731, Chulumani, 1 BM; 1630/6728, 3 km S of Irupana, 1 AM. **Pando:** 1124/6713, La Cruz, 1 AM; 1126/6734, Independencia, 1 MSB; 1216/6827, 8 km SO de [= SW of] Santa Rosa, 1 CBF; 1223/6835, Isla Gargantua, 1 AM. **Santa Cruz:** 1420/6225, PRNB, 2 MNK; 1629/6444, río Ichilo, 54 km S of mouth of río Chapare, 1 AM; 1647/6314, Estancia Cachuela Esperanza, 1 AM; 1727/6340, Buena Vista, 1 MACN (not seen); 1728/6342, 4 km SW of Buena Vista, 1 MSB; 1736/6336, San Rafael de Amboró, 5 AM (261987–261991), 1 CBF, 4 MSB; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 5 AM, 1 MSB; 1747/6322, 2 km SW of Las Cruces, 1 AM (263815), 1 MNK; 1811/6344, 1 km NE Estancia Cuevas, 2 AM, 2 MSB, 2 MNK.

Genus *Nectomys* Peters, 1861

TAXONOMIC REMARKS: In a study of proteins by electrophoresis (Dickerman and Yates, 1995: 182), *Nectomys squamipes* was placed among species of *Oryzomys*. Based on these data, *Oryzomys* seems polyphyletic, and *Nectomys* might be included in *Oryzomys*. These interesting possibilities should be explored in greater detail before changing the generic classification here.

Nectomys squamipes (Brants), 1827

Neotropical Water Rat or Rata Nadadora are vernacular names used by Eisenberg (1989: 359).

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Nectomys Garleppii* was described by Thomas (1899: 41), type locality Valley of the río "Ocabamba, Cuzco" department, Peru. *Mus squamipes* was described by Brants (1827: 138); type locality Brazil restricted by Gyldenstolpe (1932: 66) to "Southern Brazil, Sao Paulo Province," and restricted further by Hershkovitz (1944: 38) to São Sebastiao in São Paulo. Hershkovitz (1944: 59) first used the name combination *Nectomys squamipes garleppii*. Reig (1986: 406) suggested that *Nectomys garleppii* may be a distinct species. In any event, the genus needs revision.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from Charuplaya (AM 37177, BM 1902.1.1.18 to 21, 1902.1.1.23 and 24), Peru (AM 16057), and the río Challana (UM 126771).

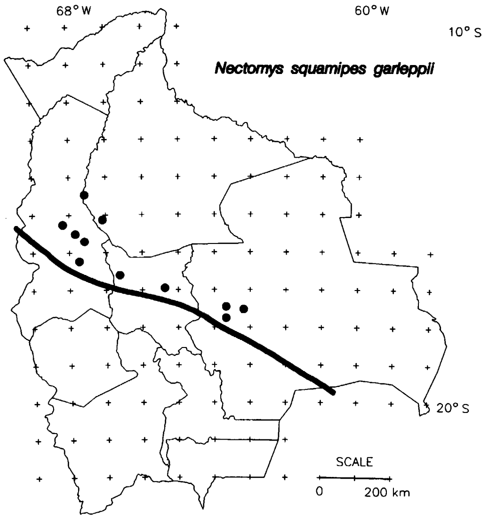


Fig. 685. Localities of known occurrence of *Nectomys squamipes garleppii.*

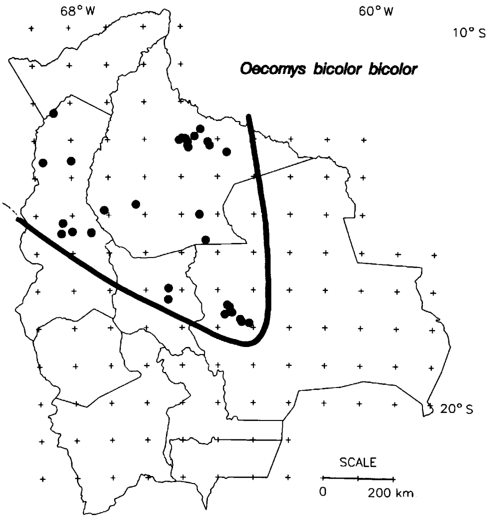


Fig. 686. Localities of known occurrence of *Oecomys bicolor bicolor.*

Distributional Notes: Known localities are listed below and mapped in figure 685.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Nectomys squamipes garleppii (Thomas), 1884

Nectomys Garleppi: Thomas, 1902a: 129 (Charuplaya).

Nectomys Garleppii: Neveu-Lemaire and Grandidier, 1911: 9 (Charuplaya).

Nectomys squamipes garleppii: Anderson, 1985b: 12 (name in list). Ernest, 1986: 1 (general information). Anderson et al., 1993: 44 (vicinity of Santa Cruz de la Sierra).

Nectomys squamipes garleppi: Anderson, 1993: 36 (general distributional records).

Nectomys squamipes: Dickerman and Yates, 1995: 188 (1508/6705). Steppan, 1995: 108 (FM 117119 from Alcoche).

Localities (13) and Specimens (24): **Beni:** 1428/6734, Rurrenabaque, 1 IE; 1508/6705, 4 km N of Yacuma, 1 AM, 1 CBF, 1 MSB. **Cochabamba:** 1636/6637, Charuplaya, 1 AM, 6 BM; 1657/6522, 4 km SE Villa Tunari, 1 UMMZ. **La Paz:** 1515/6810, Mapiri (Hershkovitz, 1944); 1530/6750, 5 km SE Guanay, río Challana, 1 UMMZ; 1542/6735, 20 km NNE Caranavi, 1 UMMZ; 1542/6740, Alcoche, 1 FM; 1614/6744, Yolosito, 1 AM, 1 MSB; 1624/6731, Chulumani, 2 BM, 2 Stockholm (Patterson, 1992: 26). **Santa Cruz:** 1727/6340, Buenavista, 1 BM; 1731/6311, 3 km SW Warnes, Santa Rosita, 1 US; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 1 AM.

Genus *Oecomys* Thomas, 1906

Oecomys bicolor (Tomes), 1860

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Hesperomys bicolor* was described by Tomes (1860: 217), type locality Gualaquiza, province of Santiago-Zamora, Ecuador. Only the nominate subspecies occurs within Bolivia.

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from San Joaquín (US 364721–364725, 460734–460737, FM 96106, 96108), 7 km N and 17 km W of Buenavista (AM 246808), and San Rafael de Amboró (AM 262010).

Distributional Notes: Known localities are listed below and mapped in figure 686.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: Three females with embryos were recorded in August (3 embryos), October (4), and December (3). "Young" were recorded in February and August.

Scientific synonyms used for Bolivian specimens are:

Oecomys bicolor bicolor
(Tomes), 1860

Rhipidomys benevolens Thomas, 1901b: 369 (type locality "Chimate, Upper rio Beni, Bolivia, 68° W, 15° S, alt. 700 m.").

Oryzomys (*Oecomys*) *benevolens*: Thomas, 1906: 445 (Chimate).

Rhipidomys benevolens: Neveu-Lemaire and Grandidier, 1911: 9 (Chimate).

Oecomys benevolens: Gyldenstolpe, 1932: 40. Tate, 1932e: 10 (Chirimote).

Oryzomys benevolens: Ellerman, 1941: 357 (Chirimote).

Oryzomys bicolor benevolens: Cabrera, 1961a: 403 (Chirimote).

Oryzomys bicolor bicolor: Hershkovitz, 1960: 542 (Marban, El Palmal, Chimate, Ticunhuaya).

Oecomys bicolor bicolor: Anderson, 1985b: 12 (name in list). Anderson et al., 1993: 43 (vicinity of Santa Cruz de la Sierra).

Oecomys bicolor: Emmons, 1991: 72 (Alto río Madidi). Anderson, 1993: 36 (general distributional records). Steppan, 1995: 111 (UMMZ 155945, 10 km NW of Mapiri).

Localities (32) and Specimens (193): **Beni:** 1244/6428, Las Peñas, 5 FM; 1255/6438, Las Pampitas, 1 US; 1258/6459, Azunta, 1 FM; 1259/6453, Filadelphia, 5 FM; 1301/6503, Providencia, 2 FM; 1304/6416, Acapulco, 3 FM; 1304/6449, San Joaquín, 113 FM, 13 US (2 not seen); 1310/6413, Cayoba, 2 US; 1310/6449, San Marco, 3.5 km SW San Joaquíin, 1 US; 1313/6448, Barranquita, 1 FM; 1321/6345, El Mojon, 2 FM; 1444/6615, Campamento 08, 5 AM, 2 MNLP, 4 IE; 1452/6707, Km 35 NW of Yucumo, 1 AM, 1 MSB; 1500/6430, San Andrés, 1 FM; 1540/6420, Marbán, río Mamoré, 3 MACN (1 seen; Hershkovitz, 1960, reported 3); coordinates unknown, Las Pavas, 1 FM. **Cochabamba:** 1657/6522, 4 km SE Villa Tunari, 1 UMMZ; 1715/6523, El Palmar, in the Chapare area, 2 MACN. **La Paz:** 1333/6800, Ixiamas, Aserradero San Francisco, 3 MNLP; 1335/6846, Moira Camp, Alto río Madidi, 1 USNM (Emmons, 1991: 72); 1512/6813, 10 km by road NW of Mapiri, 4 UMMZ; 1525/6800, Chimate, 4 BM (also spelled Chirimote); 1528/6818, Ticunhuaya, 1 AM; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 1 TTU. **Pando:** 1216/6827, 8 km SO de [= SW of] Santa Rosa, 1 CBF. **Santa Cruz:** 1724/6344, 7 km N and 17 km W Buenavista, 1 AM; 1727/6340, Buenavista, 2 MACN, 1 UMMZ; 1736/6336, San Rafael de Amboró, 3 AM, 2 MSB; 1739/6348, hunting camp at 4 km S and 13 km W San Rafael de Amboró, 1 AM; 1747/6322, 2 km SW of Las Cruces, 1 AM; 1751/6320, Ayacucho, province of Ibáñez, 1 US; 1753/6307, 15 km S of Santa Cruz, 1 MSB.

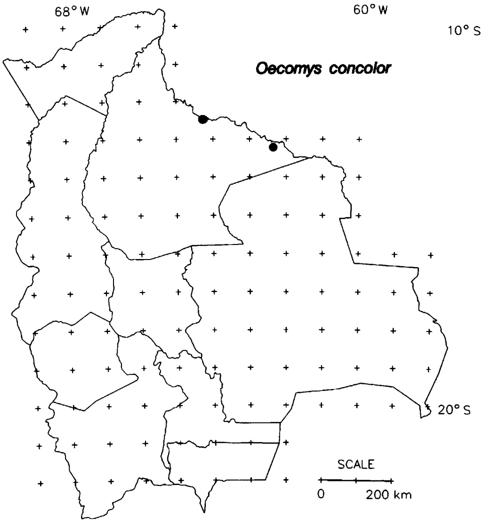


Fig. 687. Localities of known occurrence of *Oecomys concolor.*

Oecomys concolor (Wagner), 1845

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Hesperomys concolor* was described by Wagner (1845: 147), type locality "Brasilien" or Brazil, Amazonas, Rio Curicuriari, below São Gabriel. No subspecies are recognized.

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens opposite from Costa Marques (AM 209987) and from 4 km above Costa Marques (AM 210023).

Distributional Notes: Known localities are listed below and mapped in figure 687. I have no satisfactory basis for estimating the limit of its Bolivian range.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Parasitology: Brennan (1970: 811) reported a chigger, *Eutrombicula batatas*, from 4 km E of Costa Marques (= AM 210023).

Scientific synonyms used for Bolivian specimens are:

Oryzomys concolor: Brennan, 1970: 811 (chiggers, 1229/6415). Eisenberg, 1989: 349 (undocumented mention of Bolivia).

Oecomys concolor: Musser and Carleton *in* Wilson and Reeder, 1993: 716 (N. Bolivia).

Localities (3) and Specimens (3): **Beni:** 1229/6415, río Iténez, 4 km above Costa Marques [Brazil], 1 AM (210023); 1229/6417, río Iténez, bank opposite Costa Marques, 1 AM; 1313/6221, 20 km W Larangeira, Bahia de los Casara, 1 AM.

Oecomys mamorae (Thomas), 1906

Taxonomic Remarks: The names *O. concolor* and *O. roberti* have been used incorrectly for Bolivian specimens of *O. mamorae*.

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from Buenavista (FM 51907, 51913, 51915), Todos Santos (AM 38561, 38563–38578), and San Rafael de Amboró (AM 262013–262014, 262099).

Distributional Notes: Known localities are listed below and mapped in figure 688.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Parasitology: Fonseca (1960: 92) reported ticks (Ixodidae, *Ixodes* sp.; Laelaptidae, *Eubrachylaelaps rotundus*) from *Oecomys mamorae* from Buen Retiro (1717/6338). Fonseca (1960: 107) also reported *Mysolaelaps parvispinosus* in *O. mamorae* from Buen Retiro. The flea, *Polygenis* (*Polygenis*) *bohlsi bohlsi*, was reported from Buen Retiro (Smit, 1987: 296) from "*Oryzomys mamorae* [= *O. concolor*]." I have not seen a voucher specimen to verify the identification of the host.

Reproduction: Three females with embryos were recorded in September, two with three embryos and one with two. Young were recorded in April and October.

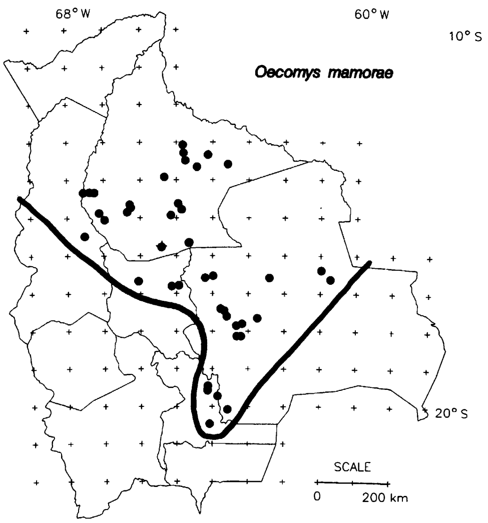


Fig. 688. Localities of known occurrence of *Oecomys mamorae*.

Scientific synonyms used for Bolivian specimens are:

Oryzomys (*Oecomys*) *mamorae* Thomas, 1906: 445 (type locality "Mosetenes, Upper Mamore, Yungas, Bolivia," in department of Cochabamba). Neveu-Lemaire and Grandidier, 1911: 10 (Mosetenes).

Oecomys mamorae: Tate, 1932e: 21. Gyldenstolpe, 1932: 41 (Mosetenes). Anderson, 1985b: 12 (name in list). Fonseca, 1960: 92 (ectoparasites, Buen Retiro). Patterson, 1992: 24 (El Consuelo, Puerto Salinas; photo of skull). Anderson, 1993: 36 (general distributional records). Anderson et al., 1993: 43 (vicinity of Santa Cruz de la Sierra). Steppan, 1995: 111 (AM 262013, San Rafael de Amboró).

Oryzomys mamorae: Ellerman, 1941: 358 (Mosetenes). Smit, 1987: 296 (fleas from Buen Retiro).

Oryzomys concolor roberti: Hershkovitz, 1960: 561 (Mosotenes, Ticucha, Todos Santos, Buenavista, Marbán, río Yapacaní).

Oecomys concolor roberti: Anderson, 1985b: 12 (name in list).

Localities (44) and Specimens (132): **Beni:** 1304/6449, San Joaquín, 6 FM; 1317/6448, Yuatre, 1 FM; 1320/6408, Magdalena, 4 FM; 1329/6445, Lucuma, 6 leagues S San Ramón, 1 US; 1335/6335, Baures, 4 FM; 1339/6426, Estancia El Valle, 3 MSB; 1355/6520, río Mamoré, 1 AM; 1419/6723, Reyes, 1 Stockholm (Patterson, 1992: 25); 1420/

6715, El Consuelo, río Beni, 1 (Patterson, 1992: 25); 1420/6733, Puerto Salinas, río Beni, 9 (Patterson, 1992: 25); 1437/6457, mouth of río Ibare, 1 AM; 1439/6617, Campamento Busurucucú, 1 AM; 1444/6615, Campamento 08, 2 MNLP; 1447/6451, 26 km from mouth, on río Ibare, 3 AM; 1451/6621, El Porvenir, 1 EBD; 1452/6707, Km 35 NW of Yucumo, 1 AM, 1 MSB; 1456/6509, río Tijamuchi, 1 AM; 1503/6658, 1 km E of La Embocada, Estancia Cabaña, 1 UMMZ; 1540/6440, Marbán, río Mamoré, 1 MACN; 1545/6523, Puerto San Lorenzo on río Sécure, 1 CBF. **Chuquisaca:** 1927/6407, Tola Orko, province of Tomina, 2 US; 1933/6408, Río Limón, 1 CBF, 1 MSB; 1934/6408, Tihumayu, 1 US; 1943/6351, 2 km E of Chuhuayaco, 1 MSB; 2005/6334, Camiri, 1 US, 1 CAS; 2028/6404, Ticucha, río Capirenda, 1 FM (Hershkovitz, 1960). **Cochabamba:** 1640/6603, Mosotenes, 3 BM; 1647/6456, Campamento Yuqui, 1 CBF; 1648/6508, Todos Santos, 26 AM, 5 FM; coordinates unknown, río Moile Ichilo, 1 (Belgium) (or in Santa Cruz?). **La Paz:** 1529/6731, 1 mi. [= 1.6 km] W of Puerto Linares, 1 MSU. **Santa Cruz:** 1623/6059, San Ignacio, province of Velasco, 1 US; 1632/6359, Yapacaní, 4 BM; 1635/6225, San Ramón, Castedo, 1 MNK; 1635/6412, Punta Rieles, 6 AM, 5 CENE; 1637/6043, Santa Ana, province of Velasco, 1 US; 1724/6346, río Yapacaní, 1 FM, 1 MACN (Hershkovitz, 1960); 1727/6340, Buenavista, 1 AM, 5 BM, 1 CM [2749], 3 MACN; 1736/6336, San Rafael de Amboró, 4 AM; 1739/6245, 3.5 km W of Estación Pailón, 1 AM, 1 MSB; 1748/6310, Santa Cruz de la Sierra, 2 CM; 1751/6320, Ayacucho, 1 US; 1808/6312, 7 km E and 3 km N Ingeniero Mora, 1 AM; 1808/6319, Basilio, province of Cordillera, 1 US. **Department unknown:** "Bolivia" only, 1 BM.

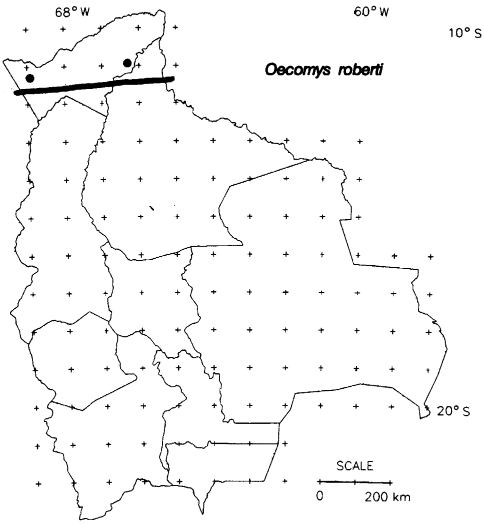


Fig. 689. Localities of known occurrence of *Oecomys roberti.*

Oecomys roberti Thomas, 1904

Taxonomic Remarks: Two names used for Bolivian specimens have type localities outside of Bolivia. The type locality of *Oryzomys trinitatis* (Allen and Chapman, 1893: 213), to which these three specimens were formerly assigned, is Princestown, Trinidad. *Oecomys roberti* was described by Thomas (1904a: 237), type locality Santa Ana de Chapada, Mato Grosso, Brazil.

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from Remanso (AM 262825) and the río Nareuda (AM 248996).

Distributional Notes: Known localities are listed below and mapped in figure 689.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Oecomys trinitatis: Anderson, 1985b: 12 (name in list, based on misidentification of the specimens listed below).

Oecomys roberti: Anderson, 1993: 36 (Pando). Steppan, 1995: 111 (Remanso and río Nareuda).

Localities (2) and Specimens (3): **Pando:** 1056/6618, Remanso, 1 AM; 1117/6855, río Nareuda, 2 AM.

Genus *Oligoryzomys* Bangs, 1900

Taxonomic Remarks: The subgenus *Oligoryzomys* was recognized by Tate (1932d) and Ellerman (1941: 340), but not by Cabrera (1961: 380). Generic status has been recognized by Musser and Carleton (*in* Wilson and Reeder, 1993: 717) and other recent authors. In an electrophoretic study of proteins, the five species of *Oligoryzomys* analyzed were judged to compose a monophyletic group, with *Neacomys* as a sister-group (Dickerman and Yates, 1995: 182).

Carleton and Musser (1989: 70) listed a number of species of *Oligoryzomys* provisionally as a "series of hypotheses" to be tested by further revisionary work. They gave no diagnostic characters, but discussed distributions and listed certain specimens. They noted further (p. 72) that the level of differentiation (i.e., subspecies or species) of *O. andinus* from *O. chacoensis* requires evaluation, their ranges being "complementary."

PARASITOLOGY: Fonseca (1960: 114) reported a laelaptid tick (*Schistolaelaps mazzai*) from "*Oryzomys* sp. (proximo de *flavescens*)" from Gutierrez (1925/6334). I have not seen a voucher specimen for the host identification but it presumably belongs in *Oligoryzomys*, as now recognized. Fonseca (1960: 121) reported *Tur amazonicus*, a laelaptid tick from "*Oligoryzomys* sp." from Buen Retiro. On geographic grounds, *O. microtis* seems most probably, but no voucher specimen has been examined.

Oligoryzomys andinus (Osgood), 1914

As a possible vernacular name, I suggest Colilargo Andino for this species.

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Oryzomys andinus* was described by Osgood (1914: 156), type locality "Hacienda Llagueda, upper rio Chicama, [northern] Peru, Altitude 6,000 feet" (07°46′S/78°35′W). See note above and taxonomic remarks under *Oligoryzomys chacoensis* on its possible relationship to *Oligoryzomys andinus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from near Huancaroma (AM 260405, 260406) and near Pocoata (AMNH 255946).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 690.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

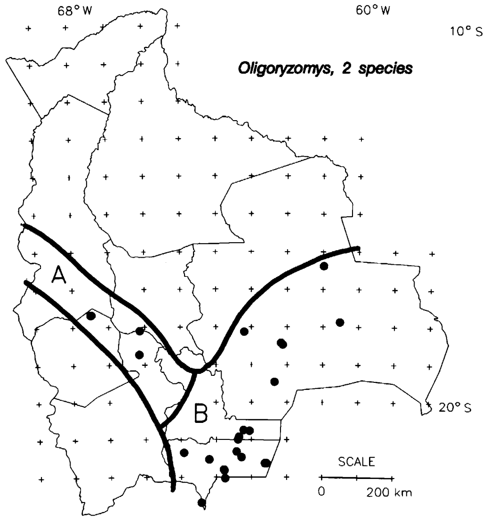


Fig. 690. Localities of known occurrence of two species of *Oligoryzomys*, *O. andinus* (A) and *O. chacoensis* (B).

Scientific synonyms used for Bolivian specimens are:

Oryzomys longicaudatus: Olds and Anderson, 1987: 269 (in part, four specimens from near Huancaroma and near Pocoata).

Oligoryzomys andinus: Carleton and Musser, 1989: 71 (in reference to the same four specimens). Anderson, 1993: 35 (general distributional records). Steppan, 1995: 111 (AM 260405).

Oligoryzomys destructor: Dickerman and Yates, 1995: 188 (in part; 1 km W Huancaroma, 1740/6730; 2 km E Huancaroma, 1740/6728).

LOCALITIES (6) AND SPECIMENS (14): **La Paz:** 1727/6737, Huaraco-Antipampa, 6 from owl pellets (Peñaranda). **Oruro:** 1740/6728, 2 km E of Huancaroma, 1 AM (260406), 1 MSB (55319); 1740/6730, 1 km W of Huancaroma, 1 AM (260405). **Potosí:** 1806/6608, 31 km from Acacio on road to Uncia, 3 CBF; 1844/6609, 3 km SE of Pocoata, 1 AM; 1931/6651, río Sevaruyo, 1 from owl pellet (Peñaranda).

Oligoryzomys chacoensis (Myers and Carleton), 1981

Colilargo Chaqueño has been used as a vernacular name for this species (Mares et al., 1989: 175).

TAXONOMIC REMARKS: Carleton and Musser, 1989: 72, regarded *O. chacoensis* as a member of the *andinus* group. The possibility that it might be a subspecies of *Oligoryzomys andinus* needs to be studied. In a study of proteins by electrophoresis, *O. chacoensis* was placed as a sister-species of *O. destructor*, within the monophyletic genus *Oligoryzomys* (Dickerman and Yates, 1995: 182). Specimens of *O. destructor* that they listed included some that are *O. andinus* (see synonymy below and taxonomic remarks under *O. destructor*). The relationships of the species within *Oligoryzomys* are much less definite than is the monophyletic status of the genus.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: *Oligoryzomys chacoensis* (Myers and Carleton, 1981: 20) was diagnosed as "A medium-sized species of the subgenus *Oligoryzomys* unique in its whitish underside with hair white to the base on the chin and throat, relatively long ears having hairs on inner surface with unusually short or absent dark basal bands, small but distinctive tufts of orangish hairs anterior to the ears, and karyotype with 2n=58, FN=74." They compared *O. chacoensis* with *O. fornesi* (of Argentina, also now considered to be a synonym of *O. microtis*) and noted that *O. chacoensis* differs in "larger size (maxillary toothrow usually more than 3.3 mm, ears usually more than 15 mm), characteristic karyotype, lack of preputial glands, and in most specimens by its lack of buff on the belly." And they noted (p. 24), "The hind feet of *chacoensis* are relatively short compared with those of the more terrestrial *fornesi*."

Measurements in tables 18 and 20 are of 15 specimens reported by Olds and Anderson (1987).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 690.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Two females taken in September had three embryos each; one had five embryos. Juveniles were recorded in February and September.

Scientific synonyms used for Bolivian specimens are:

Mus flavescens: Gerrard, 1862: 165 (three specimens from Bolivia may or may not be of this species).

Oryzomys sp.; *flavescens* group: Thomas, 1925: 578 (Caraparí, part, = BM 25.2.1.29, 30, 32, 33, and 38).

Oryzomys chacoensis Myers and Carleton, 1981: 19, type locality "419 km by road NW Villa Hayes (alongside the Trans Chaco Highway), Dept. Boquerón, Paraguay" (also Las Peñas, Tacuaral, and Taringuiti in Bolivia). Anderson, 1985b: 12 (name in list).

Oryzomys (*Oligoryzomys*) *chacoensis*: Olds and Anderson, 1987: 267 (map, six localities).

Oryzomys (*Oligoryzomys*) *longicaudatus*: Olds and Anderson, 1987: 267 (specimens from Entre Ríos and 10 mi NW of Tarija).

Oligoryzomys chacoensis: Carleton and Musser, 1989: 72 (specimens from two localities in Tarija). Voss, 1991: 112 (absence of gall bladder in five specimens from 1808/6312). Anderson, 1993: 35 (general distributional records). Dickerman and Yates, 1995: 187 (Porvenir, 2045/6313; 1.3 km SW of Porvenir, 2045/6313; 3.8 km E of Carandayti, 2046/6303). Steppan, 1995: 111 (AM 262126, "126127" [= 262127], 262129–262131, from 2045/6313).

LOCALITIES (20) AND SPECIMENS (144): **Chuquisaca:** 2045/6313, Porvenir, 7 AM, 5 MSB; 2045/6313, 1.3 km SW of Porvenir, 5 AM, 1 MSB; 2046/6303, 3.8 km by road E of Carandayti, 1 AM, 1 MSB; 2056/6321, 2 km S and 10 km E of Tiquipa, 4 AM. **Santa Cruz:** 1623/6059, San Ignacio, province of Velasco, 10 US; 1752/6031, 4 km S and 24 km E of San José de Chiquitos, 2 AM; 1808/6312, 7 km E and 3 km N Ingeniero Mora, 13 AM; 1825/6210, Tita, 1 MNLP; 1828/6207, 8 km SE of Tita, 3 AM, 1 MSB; 1927/6221, Cerro Colorado, 8 EBD. **Tarija:** 2100/6323, 1 km S of Camatindi, 2 AM, 1 MSB, 2 CBF; 2119/6325, 8 km S and 10 km E of Villa Montes, 8 AM, 1 MNLP; 2121/6455, 10 mi [= 16 km] NW of Tarija, 1 MVZ; 2128/6317, 35 km by road SE Villa Montes, Taringuiti, 5 UMMZ; 2132/6412, Entre Ríos, 3 US; 2138/6234, Estancia Bolívar, 4 AM, 3 MSB, 2 CBF; 2138/6237, 5 km W of Estancia Bolívar, 6 AM, 2 MSB, 3 CBF; 2148/6347, 3 km WNW of Caraparí, 9 AM, 5 MSB, 3 CBF; 2149/6346, Caraparí, 6 BM; 2202/6345, Yacuiba, 3 BM; 2241/6426, río Lipeo, 13 ANSP.

Oligoryzomys destructor (Tschudi), 1844

As a possible vernacular name for this species, I suggest Colilargo Destructor.

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Mus longicaudatus* was described by Bennett (1832: 2), type locality Chile restricted by Cabrera (1961a: 391) to Valparaiso. *Hesperomys destructor* was described by Tschudi (1845: 182); from eastern Peru, perhaps "haciendas along the Rio Chinchao, Huanuco Dept., Peru," as noted by Musser and Carleton (*in* Wilson and Reeder, 1993: 727). *Oryzomys stolzmanni* was described by Thomas (1894b: 357), type locality Huambo, Amazonas, Peru. In a study of proteins by electrophoresis, *Oligoryzomys destructor* was placed as a sister-species of *O. chacoensis* (Dickerman and Yates, 1995: 182). However, the specimens of *O. destructor* that they studied may belong, in part (see the synonymies), in *O. andinus*, *O. flavescens*-group (species B), and *O. microtis*. Thus the relationships within *Oligoryzomys*, regarded as tentative by Dickerman and Yates, remain to be resolved.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from Incachaca (AM 38525-38526, 38534), 17 km E of Totora (AM 264137, 264139, 264140), and Chimate (BM 1901.2.1.13, 1901.2.1.21 to 27).

DISTRIBUTIONAL NOTES: Most of the Bolivian records are from the Yungas. The range broadly overlaps that of *O. flavescens* and slightly overlaps the western edge of that of *O. microtis*. Known localities are listed below and mapped in figure 691.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Three pregnant females were recorded, one in April (five embryos), two in May (three and four embryos). One female was lactating when taken in May.

Scientific synonyms used for Bolivian specimens are:

Oryzomys longicaudatus: Thomas, 1898b: 3 (Aguairenda Mission, San Francisco); 1926c: 194 (Tupiza). Olds and Anderson, 1987: 277 (map, in part, some of the 31 localities). Mercado and Miralles, 1991: 295 (La Paz Valley).

Oryzomys Stolzmanni: Thomas, 1902a: 130 (Charuplaya, Choro). Neveu-Lemaire and Grandidier, 1911: 9 (Charuplaya, Choro).

Oryzomys (*Oligoryzomys*) *longicaudatus stolzmanni*: Hershkovitz, 1940: 81 (first use of name combination).

Oryzomys stolzmanni stolzmanni: Sanborn, 1950, 2 (río Aceramarca, Cocapunco, Ñequejahuira, Okara, Pitiguaya, Pongo; but some of these may be *Oryzomys* "sp. B").

Oryzomys (*Oligoryzomys*) *longicaudatus* ssp?: Anderson, 1985b: 12 (name in list).

Oligoryzomys destructor: Carleton and Musser, 1989: 73, and Musser and Carleton *in* Wilson and Reeder, 1993: 717 (name used but basis for use not explained). Patterson, 1992: 24 (Cuesta Cucho, Illataco, Sorata). Anderson, 1993: 35 (general distributional records). Dickerman and Yates, 1995: 187 (28 km W of Comarapa, 1751/6440; 21 km W of Comarapa, 1751/6437).

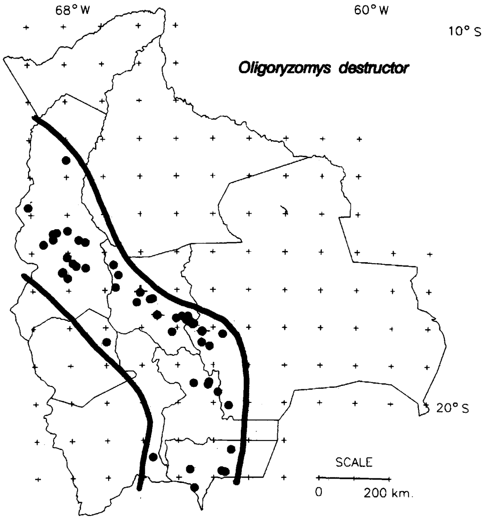


Fig. 691. Localities of known occurrence of *Oligoryzomys destructor*.

LOCALITIES (53) AND SPECIMENS (181): **Chuquisaca:** 1927/6407, Tola Orka, Tomina Province, 6 US; 1929/6433, Horcus, 80 km SE Sucal, 3 MVZ; 1931/6409, Monte Canto, 1 US; 1943/6352, Chuyayacu, 1 FM. **Cochabamba:** 1620/6645, Yungas, 1 CM; 1636/6637, Charuplaya, 13 BM (Thomas, 1902a, reported 16); 1656/6642, Choro, 8 MACN; 1702/6559, 9.4 km by road N of Tablas Monte, 1 MSB; 1714/6541, Incachaca, 9 AM, 1 BM, 1 CM; 1715/6545, Cuesta Cucho, 2 (Patterson, 1992: 24); 1720/6607, Illataco, 1 (Patterson, 1992: 24); 1740/6535, 7.5 km SE of Rodeo, 6 MSB (not all seen); 1742/6442, San Mateo, 1 MACN; 1742/6452, 20 mi [= 32 km] E of Totora, 1 MVZ; 1745/6502, 17 km E of Totora, Tinkusiri, 4 AM, 3 MSB, 2 CBF; 1748/6445, 101 km by road SE of Epizana, Siberia Cloud Forest, 1 AM; 1751/6440, 28 km by road W of Comarapa, 1 AM, 1 MSB; 1807/6509, Aiquile, 2 FM. **La Paz:** 1333/6800, Aserradero San Francisco, Ixiamas, 2 CBF; 1448/6904, Pelechuco, 1 CBF; 1525/6800, Chimate, 8 BM; 1528/6818, Ticunhuaya, 1 AM; 1530/6824, Cocapunco, 1 AM; 1539/6824, Okara, 2 AM; 1540/6742, 4 km NW Alcoche, 5 UMMZ (not seen); 1544/6731, La Reserva, 840 m elevation, 1 MSB; 1547/6840, Sorata, at base of Mt. Sorata, 4 AM; 1547/6840, Sorata, Mr. Illampu, 2 (Patterson, 1992: 24); 1607/6802, Zongo, 3050 m elevation, 1 MNLP; 1612/6842, Huatajata, 1 Bonn; 1617/6752, Ñequejahuira, 3 AM; 1621/6747, Pitiguaya, 4 AM; 1624/6731, Chulumani, 1 BM; 1630/6809, La Paz, 1 BM; 1631/6810, El Alto, 1 IE; 1640/6801, Valencia, 2 IE. **Oruro:** 1823/6659, Poopó, 1 MNLP. **Potosí:** 2127/6543, Tupiza, 1 BM. **Santa Cruz:** 1751/6437, 21 km by road W of Comarapa, 3 AM; 1754/6432, 8.5 km by road W of Comarapa, 1 AM; 1754/6434, 5 mi W of Comarapa, 1 MVZ; 1755/6434, 1 km N and 8 km W of Comarapa, 4 AM; 1805/6419, 2 km NE of Quiñe, 1 AM, 1 CBF; 1803/6419, 5 km NE of Quiñe, 1 AM, 1 CBF; 1811/6344, 1 km NE Estancia Cuevas, 2 AM; 1824/6419, 7 km by road SE of Ariruma, 1 AM; 1830/6406, Vallegrande, US 290901–290902 (Carleton and Musser p. 74); 2005/6334, near Camiri, 1 CAS. **Tarija:** 2115/6330, San Francisco, on the Pilcomayo, 1 BM (Thomas, 1898b); coordinates unknown, 70 km E of Tarija on road to Entre Ríos, 2 CBF; 2147/6440, 11.5 km N and 5.5 km E of Padcaya, 2 AM, 1 CBF; 2151/6340, Aguairenda Mission, Bolivian Chaco, 1 BM (Thomas, 1898b); 2216/6433, 3 km SE of Cuyambuyo, 2 AM, 9 MSB, 4 CBF. **Department unknown:** "Ipuno," 1 TTU; "Bolivia" only, 2 MACN, 16 BM; perhaps Bolivia, 12 BM.

Oligoryzomys sp. B (*flavescens* group)

TAXONOMIC REMARKS: At present, other than the above, there is neither a scientific nor a vernacular name for this species, if it really is separable from *O. flavescens*. *Oryzomys flavescens* was described by Waterhouse (1837: 19), type locality "Maldonado," Uruguay, as *Mus flavescens*.

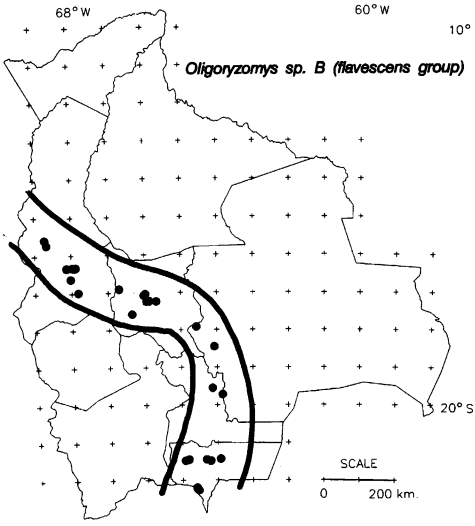


Fig. 692. Localities of known occurrence of *Oligoryzomys flavescens* group, sp. B.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from río Limón (263827, 263834, 263838) and Tapecua (AM 264168–264173; CBF 2193, 2287, 2297, 2298, 2301, 2305, 2752–2755; MSB 67309, 67352–67353, 67355–67356).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 692.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: The only pregnant female recorded had four embryos when taken in May. Nonpregnant females were recorded in May (1), June (1), July (4), August (8), and September (1).

Scientific synonyms used for Bolivian specimens are:

Oryzomys stolzmanni stolzmanni: Sanborn, 1950, 2 (in part, río Aceramarca, Pongo).

Oryzomys longicaudatus: Olds and Anderson, 1987: 277 (in part, río Aceramarca, Pongo).

Oligoryzomys sp. B in a "*flavescens* Group": Carleton and Musser, 1989: 72 (E of Tarija, W of Comarapa, SE of Epizana, Choro, Incachaca, Parotani, E of Totora, río Aceramarca, Pongo, Caracato, Tacacoma).

Oligoryzomys flavescens: Anderson, 1993: 35 (general distributional records).

Oligoryzomys destructor: Dickerman and Yates, 1995: 188 (in part, Rancho Tambo, 2127/6419).

LOCALITIES (33) AND SPECIMENS (239): **Chuquisaca:** 1933/6408, Río Limón, 19 AM, 12 MNLP, 9 MSB; 1943/6351, 2 km E of Chuhuayaco, 3 AM. **Cochabamba:** 1654/6642, El Choro, 1 AM, 1 BM, 12 FM; 1704/6601, 4.4 km by road N of Tablas Monte, 1 AM; 1713/6552, Corani, 5 AM, 2 CBF, 2 MSB; 1713/6554, 13 km N of Colomi, 7 AM, 6 CBF, 3 MSB; 1714/6541, Incachaca, 10 AM; 1714/6553, Poseidon, Laguna de Corani, 12.5 km N of Colomi, 1 AM, 1 CBF, 2 MSB; 1714/6557, 16.5 km NW of Colomi, 6 AM, 6 CBF, 5 MSB; 1734/6621, Parotani, 2 AM, 1 FM; coordinates unknown, Km 79 on Cochabamba to Oruro road, 2 CBF; coordinates unknown, near Misque, 1 CBF; coordinates unknown, 25 km S of Arami on road to Misque, 1 CBF. **La Paz:** 1535/6843, Tacacoma, 1 AM; 1535/6843, Tacacoma-Sorata, 2 AM; 1543/6840, 10 km by road N of Sorata, 2 UMMZ; 1619/6753, río Aceramarca, 1 MSB; 1619/6758, Mina Lourdes, 1 CBF; 1620/6756, Pongo, 15 AM; 1620/6808, Mt. Chacaltaya, 1 UMMZ; 1637/6801, Mecapaca, 3 CBF; 1659/6749, Caracato, 5 AM; location unknown, NK25653. **Santa Cruz:** 1755/6434, 1 km N and 8 km W of Comarapa, 1 MSB; 1827/6404, 5.5 km by road NNE of Vallegrande (río Cienega), 1 AM. **Tarija:** 2126/6355, Tapecua, 9 AM, 9 MSB, 12 CBF; 2127/6419, Rancho Tambo, 61 km by road E of Tarija, 3 AM (262933–262935), 1 MSB (57166); 2127/6449, 1 km E of Tucumilla, 3 AM, 3 MSB; 2129/6412, 5 km NNW of Entre Ríos, 8 AM, 12 CBF, 9 MSB; 2129/6455, 4.5 km E of Iscayachi, 2 AM; 2212/6436, 8 km by road N of Cuyambuyo, 2 UMMZ; 2213/6436, 4 km by road N of Cuyambuyo, 10 UMMZ; 2216/6433, 3 km SE of Cuyambuyo, 1 AM. **Department unknown:** coordinates unknown, Zapial, 1 US.

Oligoryzomys microtis Allen, 1916

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Mus nigripes* was described by Desmarest (1819: 64); type locality "Paraguay" or Atira, 250 km from Asunción, Paraguay (Cabrera, 1961: 394). *Oryzomys* (*Oligoryzomys*) *microtis* was described by Allen (1916a: 525), type locality "Lower Rio Solimoens (fifty miles above mouth)" = 80 km from its confluence with río Negro, Amazonas, Brazil. *Oryzomys fornesi* was described by Massoia (1973: 22), type locality Naineck, department of Río Pilcomayo in the province of Formosa, Argentina. Olds and Anderson (1987) regarded *O. chaparensis* and *O. fornesi* as conspecific with *Oryzomys microtis*.

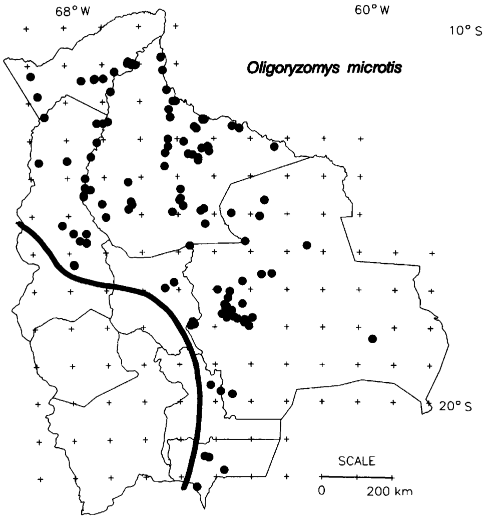


Fig. 693. Localities of known occurrence of *Oligoryzomys microtis*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of 67 specimens from Olds and Anderson (1987). No gall bladder is present (Voss, 1991: 112).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 693.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

PARASITOLOGY: Brennan (1970: 811) reported the chigger, *Eutrombicula batatas*, from Pampa de Meio.

REPRODUCTION: Ten pregnant females were recorded in March, May, August, and September. Numbers of embryos (and cases) were three (6), four (3), and five (1). Three lactating females were recorded in June, July, and August. Females (24) without embryos were recorded in July (11), August (8), September (2), and October (3).

Scientific synonyms used for Bolivian specimens are:

Oryzomys (*Oligoryzomys*) *microtis*: Olds and Anderson, 1987: 271 (map, 45 localities).

Oryzomys chaparensis Osgood, 1916: 205 (type locality Todos Santos, on río Chapare, department of Cochabamba, Bolivia). Gyldenstolpe, 1932: 25 (Todos Santos). Myers and Carleton, 1981: 38 (Todos Santos), all in reference to the same two specimens.

Oryzomys sp.: Thomas, 1925: 578 (part, = BM 25.2.1.31, 34, 36, and 37).

Oryzomys nigripes: Brennan, 1970: 811 (Pampa de Meio).

Oryzomys fornesi: Myers and Carleton, 1981: 25 (San Joaquín).

Oryzomys (*Oligoryzomys*) *microtis*: Anderson, 1985b: 12 (name in list).

Oligoryzomys microtis: Carleton and Musser, 1989: 71 (elevated *Oligoryzomys* to genus), Voss, 1991: 112 (seven specimens from Ayacucho). Patterson, 1992: 24 (Victoria). Emmons, 1991: 73 (Alto río Madidi). Anderson, 1993: 35 (general distributional records). Anderson et al., 1993: 42 (vicinity of Santa Cruz de la Sierra). Dickerman and Yates, 1995: 187 (1056/6618, 1123/6712, 1223/6835, 1442/6704, 1456/6509, 1647/6314, 1736/6336, 1818/5936). Steppan, 1995: 111 (AM "266947" [= 255947]–255950, 255952, 255953, from 1454/6422).

Oligoryzomys destructor: Dickerman and Yates, 1995: 188 (in part; Rancho Tambo).

LOCALITIES (126) AND SPECIMENS (618): **Beni:** 1049/6525, Guayaramerin, 2 AM; 1110/6522, 4 km below Santa Cruz, 1 AM; 1142/6516, 4 km S Santa Rosa, 4 AM; 1144/6647, boca del río Biata, 2 AM, 3 MSB; 1200/6502, río Iténez, 20 km from mouth, 2 AM; 1200/6506, Puerto Moré, río Iténez, 3 AM; 1213/6513, río Mamoré on bank opposite Cascajal, 16 AM; 1226/6511, río Mamoré, 2 AM; 1229/6417, río Iténez, opposite Costa Marques [Brazil], 10 AM; 1229/6418, río Iténez, 1.5 km below Costa Marques, 1 AM; 1230/6415, Pampa de Meio, 2 AM; 1230/6418, mouth of río Baures, 6 AM; 1240/6330, mouth of río Curiche, 6 AM; 1241/6432, 15 km above Horquilla on río Machupo, 1 AM; 1244/6318, Versalles, 1 AM; 1244/6428, Las Peñas, 3 FM, 1 US; 1300/6515, río Mamoré, 1 AM; 1304/6449, San Joaquín, 1 FM, 4 US (Myers and Carleton, 1981); 1312/6410, Cachuelita, 1 US; 1312/6515, 8 km N Exaltación, 6 AM; 1313/6221, 20 km W Larangeira, Bahía de los Casara, 2 AM; 1313/6409, Boroica, 1 US; 1315/6420, Piedras Blancas, 1 MNK; 1320/6408, Magdalena, 2 FM; 1322/6520, Palacios, prov. of Yacuma, 1 US; 1324/6442, Chaco Lejo, 20 km SE of San Ramón, 2 US; 1325/6435, Tacuaral, 1 US; 1330/6426, Estancia Bolpebra, 1 MSB; 1334/6426, Estancia El Valle, 2 MSB; 1343/6521, Puerto Caballo, 2 AM; 1350/?, La Colonial, río Negro, 2 IML; 1408/6621, Espíritu, 1 MNLP, 1 IE; 1419/6723, Reyes, 1 BM; 1420/6455, 10 km W San Pedro, on río Mamoré, 5 AM; 1428/6734, Rurrenabaque, 2 AM; 1430/6734, 3 km S of Rurrenabaque, 6 AM, 3 MSB; 1434/6455, 23 km W San Javier, 1 AM; 1437/6457, mouth of río Ibare, 2 AM; 1439/6617, Campamento Busurucucú, 2 MNLP; 1442/6704, 45 km N of Yacuma, 20 AM, 8 MSB; 1444/6615, Campamento 08, 2 AM, 2 MNLP; 1446/6451, río Ibare, 24 km from mouth, 1 AM; 1451/6417, río Matos, 6 km E of Estación Biológica del Beni, 2 AM; 1451/6621, La Cabaña, Estación Biológica del Beni, 1 EBD; 1451/6621, El Porvenir, 1 EBD; 1451/6621, Totaisal, 1 km SW of Estación Biológica del Beni, 3 AM, 2 MSB; 1454/6422, 6 km W of Casarabe, 7 AM; 1456/6509, río Tijamuchi, 15 AM, 8 MSB; 1503/6658, 1 km E of La Embocada, 2 UMMZ; 1515/6415, El Triunfo, 1 US; 1550/6441, 5 km NW of mouth of río Grande, 2 AM (skull of AM 211781 figured by Carleton and Musser, 1989: 24); coordinates unknown, Centenela, 1 FM; "Beni" only, 1 AM; coordinates unknown, Laguna Bolivia, 1 CBF. **Chuquisaca:** 1933/6408, Río Limón, 1 AM; 1943/6351, 2 km E of Chuhuayaco, 4 MNLP, 3 MSB. **Cochabamba:** 1648/6508, Todos Santos, 1 AM, 1 FM; 1657/6523, 2 km E of Villa Tunari, 4 AM; 1757/6440, 28 km by road W of Comarapa, 1 MSB. **La Paz:** 1232/6652, río Madidi, 1 BM; 1234/6700, río Madidi, 8 km from mouth, 12 AM, 5 MSB; 1234/6710, Santa Ana de Madidi, 1 AM; 1304/6711, río Beni, 4 AM, 2 MSB; 1327/6721, río Beni, 3 AM, 1 MSB; 1333/6800, Ixiamus, Aserradero San Francisco, 1 MNLP; 1335/6846, Alto río Madidi (Emmons, 1991: 73); 1401/6731, río Beni, 8 AM, 1 MSB; 1416/6732, río Beni, 4 AM, 5 MSB; 1515/6810, Mapiri, 5 AM; 1528/6752, Guanay, 1 AM; 1529/6731, 1 mi [= 1.6 km] W Puerto Linares, 6 MSU, 4 TTU; 1540/6742, 4 km NW of Alcoche, 2 UMMZ; 1543/6731, La Reserva, 950 m elevation, 5 AMNH, 2 CBF, 1 MSB; 1544/6731, La Reserva, 840 m elevation, 6 AMNH, 5 CBF, 6 MSB; 1618/6753, río Aceramarca, 1 AM; 1619/6752, Ñequejahuira, 1 AM. **Pando:** 1056/6618, Remanso, 20 AM, 9 MSB, 1 MNLP; 1059/6610, Victoria, 1 (Patterson, 1992: 24); 1059/6618, confluencia del ríos Madre de Dios y Beni, 1 Stockholm; 1059/6619, left bank of río Madre de Dios, 1 MSB; 1101/6606, W bank río Beni, opposite Hamburgo, 1 MSB; 1101/6612, Agua Dulce, 17 AM, 9 MSB; 1112/6640, left bank río Madre de Dios, 1 MSB; 1117/6855, río Nareuda, 11 AM (skull of AM 248993 figured by Carleton and Musser, 1989: 28 and 31); 1123/6658, mouth of Arroyo Canada, 1 AM; 1123/6712, Bella Vista, 3 AM, 1 MSB; 1124/6713, La Cruz, 11 AM, 7 MSB; 1126/6734, right bank río Madre de Dios, opposite Independencia, 5 AM, 2 MSB, 1 MNLP; 1126/6734, Independencia, 9 AM, 4 MSB; 1150/6845, Manuripi Heath National Wildlife Reserve, 1 MNK; 1223/6835, Isla Gargantua, 33 AM, 13 MSB. **Santa Cruz:** 1438/6237, Perseverencia, 1 MNK; 1458/6332, Pajaral, 2 MNK; 1503/6245, río Negrillo, 2 MNK; 1543/6309, 6 km by road W of Ascención, 9 AM, 12 MSB; 1550/6127, Santa Rosa de la Roca, 1 AM; 1635/6225, San Ramón, Castedo, 3 MNK; 1636/6242, 10 km N of San Ramón, 5 AM, 2 MSB; 1647/6314, Estancia Cachuela Esperanza, 6 AM, 3 MSB; 1700/6355, Ayacucho, 17 AM (stomach of AM 263328 figured by Carleton and Musser, 1989: 48), 1 CENE, 1 MNK; 1703/6335, 7 km N Santa Rosa, 1 AM; 1713/6338, 6 km N of Buen Retiro, 1 AM, 1 MSB; 1723/6314, 3 km SE Montero, 1 km N of Villa Copacabana, 2 AM, 1 MSB, 1 MNK; 1724/6344, 7 km N and 17 km W of Buenavista, 3 AM; 1727/6340, Buenavista, 1 BM; 1728/6342, 4 km SW of Buena Vista, 1 MSB; 1733/6332, 2 km S of Caranda, 1 MSB; 1736/6336, San Rafael de Amboró, 8 AM, 4 MSB; 1734/6342, 3 km N and 13.5 km W of San Rafael de Amboró, río Saguayo, 1 MSB; 1739/6348, hunting camp at 4 km S and 13 km W San Rafael de Amboró, 1 AM; 1744/6328, 4 km SW of Estancia San Pedro, 440 m elevation, 1 MSB; 1745/6257, Cotoca, 1 AM, + other owl pellet material in La Paz; 1747/6322, 2 km SW Las Cruces, 1 AM, 1 MNK; 1747/6322, 3 km SW Las Cruces, 1 MNK; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 17 AM, 5 MSB; 1748/6310, Santa Cruz de la Sierra, 1 AM, 1 from owl pellet in collection in La Paz; 1751/6437, 21 km by road W of Comarapa, 1 MSB; 1753/6307, 15 km S of Santa Cruz, 1 MSB; 1753/6311, 10.5 km S of Santa Cruz de la Sierra, 1 AM; 1755/6434, 1 km N and 8 km W of Comarapa, 2 MSB; 1758/6303, 27 km SE of Santa Cruz, 1 MSB; 1818/5936, 4 km N and 1 km W of Santiago de Chiquitos, 4 AM (skull of AM 260416 figured by Carleton and Musser, 1989: 37), 1 MSB; 1948/6331, Cerro Itahuaticua, 1 AM, 1 MSB. **Tarija:** 2127/6419, Rancho Tambo, 61 km by road E of Tarija, 1 MSB (57165); 2129/6412, 5 km NNW of Entre Ríos, 3 AM; 2149/6346, Caraparí, 4 BM (25.2.1.31, 34, 36, and 37); 2216/6433, 3 km SE of Cuyambuyo, 7 AM.

Oligoryzomys, species not determined

The following material in various collections has been listed as *Oryzomys nigripes*, *O. delicatus*, *O. flavescens*, or *nigripes*-complex. According to Myers and Carleton (1981), *O. nigripes* does not reach Bolivia. Similar species in lowland Bolivia are *O. microtis* and *O. chacoensis*. Presumably, all of the specimens listed below are *O. chacoensis*, *O. flavescens* group sp. B, *O. andinus*, or *O. microtis*.

LOCALITIES (15) AND SPECIMENS (99): **Beni** (probably all *O. microtis*): 1304/6448, Camino Vilches, 3 FM [117069–117071]; 1335/6335, Baures, 3 FM [117076–117078]; 1439/6617, Busurucucú, 2 IE; 1444/6615, Campamento 08, 1 IE. **Chuquisaca:** 1904/6449, 12 km N and 11 km E of Tarabuco, 4 AM, 2 MNLP, 2 MSB; 1908/6456, 4 km N of Tarabuco, 1 AM; 1912/6427, 11 km N and 16 km W of Padilla, 1 AM, 1 MNLP, 1 MSB; 1918/6422, 9 km by road N of Padilla, 4 AM, 3 MNLP, 4 MSB; 1949/6358, 2 km SW of Monteagudo, 20 AM, 13 MNLP, 8 MSB. **Cochabamba:** 1724/6609, Cochabamba, 1 AM, and 7 others from owl pellets are in La Paz. **Santa Cruz:** 1830/6406, Vallegrande, 1 US (not seen); 1830/6406, farm near Vallegrande, 1 US (not seen). **Tarija:** 2129/6412, 5 km NNW of Entre Ríos, 2 MSB. **Department unknown:** coordinates unknown, Zapial, 1 US; "Bolivia" only, 5 FM [117082–117086]; perhaps Bolivia, 2 BM.

Genus *Oryzomys* Baird, 1858

The report by Thomas (1902a: 138) of *Oryzomys* (*Melanomys*) *caliginosus* (Tomes, 1860, type locality Esmeraldas, province of Esmeraldas, Ecuador) from Bolivia was based on specimens of *Akodon aerosus baliolus*, and thus the presence of *Oryzomys caliginosus* in Bolivia has not been confirmed.

Oryzomys capito (Olfers *in* Eschwege), 1818

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Mus capito* was described by Olfers (*in* Eschwege, 1818: 209); type locality San Ignacio Guazu, Paraguay. *Mus laticeps* was described by Lund (1841: 279), type locality Lagoa Santa, Minas Gerais, Brazil. In a study of proteins by electrophoresis (Dickerman and Yates, 1995: 182), *O. capito* was placed as a sister-species with "*O. keaysi*" (= *O. levipes*).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from opposite Costa Marques (AM 209962–209970, 209972, 209974) and the río Baures (AM 209948, 209951, 209955, 209958–209961, 210016–210018, in part).

DISTRIBUTIONAL NOTES: Most of the localities are in the tropical and subtropical lowlands but the species occurs in the Yungas up to at least 1114 m elevation (Chijchijpa). Known localities are listed below and mapped in figure 694.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

PARASITOLOGY: Five species of chiggers were reported by Brennan (1970). *Eusaperium vangelderi* Brennan (1970: 807) has as its symbiotype AMNH 210011 from Remansos. *Eutrombicula batatas* was reported from opposite Costa Marques, mouth of Baures River, Remanso, 20 km W Larageira, and Pampa de Meio (Brennan, 1970: 811). *Colicus johnsoni* was reported from opposite Costa Marques. Finally, *Parasecia aitkeni* and *Euschoengastia tragulata* were reported from the mouth of the Baures River. Identifications of the hosts are probably correct; however catalogue numbers of the voucher specimens of *Oryzomys capito* were not cited, so host identifications cannot be checked.

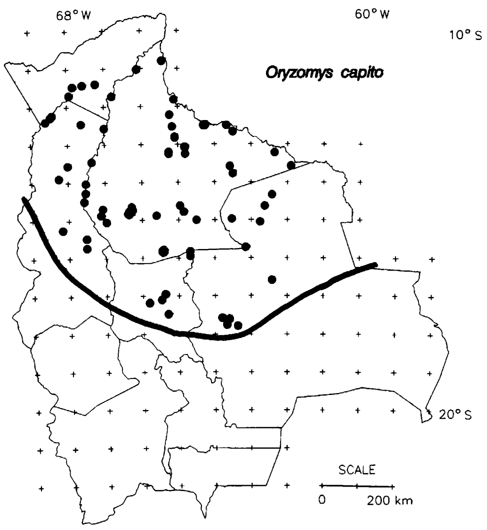


Fig. 694. Localities of known occurrence of *Oryzomys capito*.

REPRODUCTION: Ten pregnant females were recorded in July, August, and September. Embryos present were 2 (in 3 cases), 3 (in 5), 4 (1), and 5 (1). Lactation was recorded in one female in August and young were present in October, November, and December. Females without embryos were recorded in January (1), July (4), September (7), and October (2).

Scientific synonyms used for Bolivian specimens are:

Oryzomys capito: Brennan, 1970: 807 (chigger from the specimen from Remansos). Eisenberg, 1989: 351 (mentioned Bolivia and included *laticeps* in *capito*). Emmons, 1991: 73 (13 km W of Ixiamas). Anderson, 1993: 36 (general distributional records). Anderson et al., 1993: 42 (vicinity of Santa Cruz de la Sierra). Dickerman and Yates, 1995: 188 (1736/6336). Steppan, 1995: 111 (AM 209961, 209968, 210016–210018, from 1230/6418, 1229/6417, 1230/6418).

Oryzomys (*Oryzomys*) *capito yunganus*: Anderson, 1985b: 12 (this name in a list referred in part to *O. capito*, *yunganus* not then being recognized as a separate species).

Oryzomys (*Oryzomys*) *laticeps*: Anderson, 1985b: 12 (name in list).

Oryzomys laticeps: Anderson, 1993: 36 (possibly in Bolivia).

LOCALITIES (78) AND SPECIMENS (313): **Beni:** 1048/6525, opposite Guayaramerin (on island?), 1 AM; 1144/6647, boca del río Biata, 3 AM, 6 MSB; 1149/6506, 7 km N Lagoinha on río Mamoré, 1 AM; 1213/6513, river bank opposite Cascajal, 3 AM; 1229/6415, río Iténez, 4 km above Costa Marques [Brazil], 8 AM; 1229/6417, río Iténez, bank opposite Costa Marques, 45 AM; 1230/6340, Isla Belem, río Iténez, 1 AM; 1230/6415, Pampa de Meio, 3 AM; 1230/6418, mouth of río Baures, 17 AM; 1232/6509, 17 km NNW Nuevo Berlin, 1 AM; 1240/6330, mouth of río Curiche, 1 AM; 1248/6505, Puerto Siles, 1 AM; 1249/6505, 2 km SE Puerto Siles, 1 AM; 1304/6448, Camino Vilches, 5 FM; 1304/6449, San Joaquín, 6 FM, 2 US; 1312/6515, 8 km N Exaltación, 1 AM; 1313/6221, 20 km W Larangeira, Bahía de los Casara, 3 AM; 1315/6448, Yutioles, 1 US; 1315/6515, río Mamoré, 1 AM; 1327/6721, río Beni, 5 AM, 1 MSB; 1334/6154, Remansos, 1 AM; 1335/6335, Baures, 2 FM; coordinates unknown, Arruda, 4 FM; 1346/6330, Lago Victoria, 8 FM; 1416/6732, río Beni, 4 AM, 4 MSB; 1430/6734, 3 km S of Rurrenabaque, 3 AM, 1 MSB; 1437/6457, mouth of río Ibare, 1 AM; 1439/6617, Campamento Busurucucú, 1 IE, 1 MNPL; 1442/6704, 45 km N of Yacuma, 3 AM; 1444/6615, Campamento 08, 1 CBF; 1446/6621, Campamento La Pascana, 1 MNLP; 1447/6451, río Ibare, 26 km from mouth, 2 AM; 1448/6618, 2 km E of El Trapiche, 2 AM, 2 MNLP; 1448/6619, Campamento El Trapiche, 2 AM, 2 IE, 2 MNPL; 1450/6623, 5 km N of El Porvenir, 3 MNLP; 1451/6621, Estación Biológica del Beni, 1 AM, 1 IE, 2 MSB; 1451/6621, Totaisal, 1 km SW of Estación Biológica del Beni, 2 AM, 1 MSB; 1452/6707, Km 35 NW of Yucumo, 2 AMNH, 3 CBF, 4 MSB; 1453/6536, San Ignacio, province of Moxos, 3 US; 1500/6430, San Andrés, 1 FM; 1503/6658, 1 km E of La Embocada, 8 UMMZ; 1550/6441, 5 km NW of mouth of río Grande, 1 AM; coordinates unknown, Centenela, 6 FM; 1545/6523, Puerto San Lorenzo, 1 CBF. **Cochabamba:** 1657/6522, Hotel Las Pozas, Villa Tunari, 1 EBD; 1657/6523, 2 km E of Villa Tunari, 4 AM; 1711/6549, Chapare, 1 BM; 1728/6518, Totora, 15 km N of Monte Punco, 1 IML. **La Paz:** 1234/6700, río Madidi, 8 km from mouth, 1 AM; 1333/6800, Ixiamas, Aserradero San Francisco, 3 MNLP; 1353/6815, 13 km W of Ixiamas, 1 CBF, 1 USNM; 1401/6731, río Beni, 3 AM; 1416/6732, río Beni, 3 AM, 4 MSB; 1515/6810, San Ernesto, 1 BM; 1529/6731, 1 mi [= 1.6 km] W Puerto Linares, 2 MSU; 1544/6731, La Reserva, 3 AM. **Pando:** 1101/6606, W bank río Beni, opposite Hamburgo, 1 AM, 1 MSB; 1124/6713, La Cruz, 2 AM, 1 MSB; 1126/6734, Independencia, 1 AM, 1 MSB; 1126/6734, right bank río Madre de Dios, opposite Independencia, 1 AM, 1 MSB; 1128/6750, 15 km NO [= NW] of Puerto Camacho, 1 CBF; 1142/6756, Palmira, 1 AM, 1 MSB; 1213/6824, Santa Rosa, 2 AM; 1216/6827, 8 km SO [= SW] of Santa Rosa, 6 CBF; 1223/6835, Chivé, 8 MNLP; 1223/6835, Isla Gargantua, 5 AM, 2 MSB; 1227/6737, río Manupare, 1 MNLP. **Santa Cruz:** 1420/6225, [PRBN] 2 MNK; 1438/6237, Perseverencia, 4 MNK; 1458/6332, Pajaral, 2 MNK; 1503/6245, río Negrillo, 3 MNK; 1543/6309, 6 km by road W of Ascención, 1 MSB; 1557/6441, 2 km N of mouth of río Chapare, 4 AM; 1635/6225, San Ramón, Castedo, 4 MNK; 1734/6348, 3 km N and 13.5 km W of San Rafael de Amboró, río Saguayo, 400 m elevation, 3 AM; 1736/6336, San Rafael de Amboró, 8 AM, 3 MSB; 1747/6322, 2 km SW of Las Cruces, 1 AM, 1 MSB, 2 MNK; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 5 AM, 1 MSB. **Department unknown:** "Bolivia" only, 1 FM.

Oryzomys legatus Thomas, 1925

TAXONOMIC REMARKS: Musser and Carleton (*in* Wilson and Reeder, 1993: 723) tentatively retained *legatus* as a distinct species "pending determination of its status with regard to *O. nitidus*."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from río Limón (AM 263881–263885) and 5 km WNW of Entre Ríos (AM 264188–264189).

DISTRIBUTIONAL NOTES: Known localities, all in or near the Andean foothills in southern

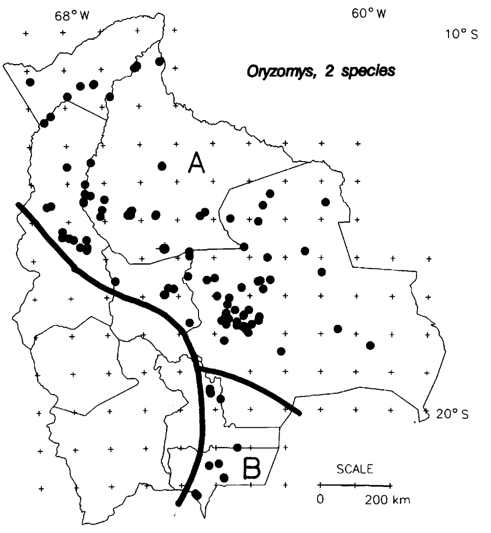


Fig. 695. Localities of known occurrence of *Oryzomys nitidus* (A) and *O. legatus* (B).

Bolivia, are listed below and mapped in figure 695.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

PARASITOLOGY: Fonseca (1960: 113, 114) reported laelaptid ticks (*Eulaelaps halleri* and *Schistolaelaps mazzai*) from *Oryzomys legatus* from Serrano (1906/6422). The flea, *Polygenis* (*Polygenis*) *tripus*, was reported from Serrano (Smit, 1987: 303). No voucher specimen for the host has been seen, so I have not verified the host identification.

Scientific synonyms relevant to Bolivian specimens are:

Oryzomys legatus Thomas, 1925: 577 (type locality "Carapari, 1000 m." in Tarija, Bolivia).

Oryzomys (*Oryzomys*) *legatus*: Tate, 1932c: 18. (name combination).

Oryzomys (*Oryzomys*) *nitidus*: Anderson, 1985b: 12 (*O. legatus* treated as a synonym of *O. nitidus*).

Oryzomys [*capito*] *legatus*: Smit, 1987: 303 (fleas from Serrano).

LOCALITIES (13), SPECIMENS (45): **Chuquisaca:** 1927/6409, Tola Orka, 4 US; 1931/6409, Montecantu, 3 US; 1933/6408, Río Limón, 5 AM, 3 MNLP, 2 MSB; 1934/6408, Tihumayo, province of Tomina, 1 US; 1943/6351, 2 km E of Chuhuayaco, 2 AM, 1 MNLP, 1 MSB. **Tarija:** 2100/6323, 1 km S of Camatindi, 1 AM; 2126/6355, Tapecua, 6 MSB; 2129/6412, 5 km NNW of Entre Ríos, 3 AM, 3 CBF; 2148/6347, 3 km WNW of Caraparí, 2 AM, 3 CBF; 2149/6346, Carapirí, 2 BM; 2213/6436, 4 km by road N of Cuyambuyo, río Sidras, 1 UMMZ; 2216/6433, 3 km SE of Cuyambuyo, 1 AM; 2241/6426, río Lipeo, 1 ANSP.

Oryzomys levipes Thomas, 1902

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Oryzomys keaysi* (described by Allen, 1900c: 225, type locality "Juliaca, Peru, altitude 6000 feet") was said to be restricted to the "montane rainforest of E Peruvian Andes" by Musser and Carleton (*in* Wilson and Reeder, 1993: 723), who then used the name *Oryzomys levipes* for related forms in the "cloud forest of SE Peru to WC [i.e., west central] Bolivia," on the grounds that *O. levipes* is "genetically divergent from and altitudinally parapatric to *O. keaysi* in Peru (see Patton et al., 1990)." In a study of proteins by electrophoresis (Dickerman and Yates, 1995: 182), *O. capito* was placed as a sister-species with "*O. keaysi*" (= *O. levipes*). By this I do not mean to imply that *keaysi* and *levipes* are conspecific; I mean that the specimens studied by Dickerman and Yates are *O. levipes*. My present taxonomic hypothesis is that all of the Bolivian material referred to in this account is of one species and that is *O. levipes*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from Incachaca (AM 38545–38549, 38551–38556, 38639—38640, CM 5250, 5254, 5262, 5236–5237, BM 34.9.2.168, 34.9.2.134, and 34.9.2.138) and 28 km W of Comarapa (AM 260346–260351).

DISTRIBUTIONAL NOTES: Known localities, all in the humid and forested Yungas, are listed below and mapped in figure 696.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Females without embryos were recorded in June (4), July (2), and September (1). Two pregnant females taken in August had two and four embryos.

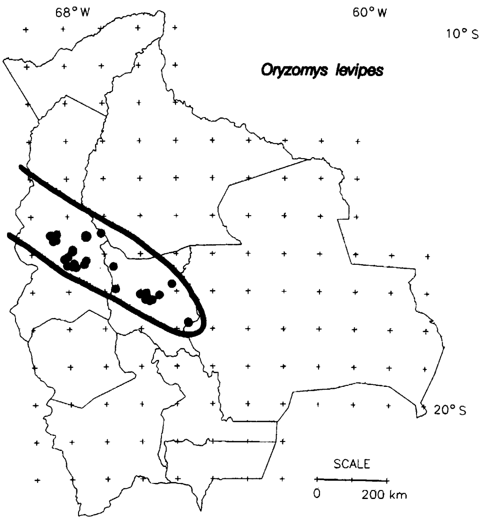


Fig. 696. Localities of known occurrence of *Oryzomys levipes*.

Scientific synonyms used for Bolivian specimens are:

Oryzomys levipes Thomas, 1902a: 129 (type locality Limbane, Peru; also Choro, Yuncas, Astillero). Anderson, 1993: 36 (possibly occurs in Bolivia).

Oryzomys keaysi: Sanborn, 1950: 2 (Chapare, Yungas del Palmar, Ñequejahuira, Okara). Patterson, 1992: 23 (Cuesta Cucho, Locotal, photo of skull). Anderson, 1993: 36 (general distributional records). Dickerman and Yates, 1995: 188 (1751/6440). Steppan, 1995: 111 (AM 260346–260349, 260351, from 1751/6440).

Oryzomys (*Oryzomys*) *keaysi*: Anderson, 1985b: 12 (name in list).

LOCALITIES (36) AND SPECIMENS (248): **Cochabamba:** 1620/6645, Yungas de Cochabamba, 2 BM, 2 CM; 1648/6508, Todos Santos, 17 AM; 1656/6642, Choro, 1 BM; 1700/6550, Yungas de Cochabamba, 3 AM; 1704/6601, 4.4 km by road N of Tablas Monte, 4 AM, 1 CBF, 1 MSB; 1706/6529, Yungas del Palmar, 3 BM, 6 FM; 1706/6529, Palmar, 2 MACN; 1711/6548, Locotal, 1 AM (Patterson, 1992: 23); 1711/6549, Chapare, 7 BM, 1 FM; 1713/6552, Corani, 8 AM, 5 CBF, 5 MSB; 1714/6528, 16.5 km NW of Colomi, 2 AM; 1714/6541, Incachaca, 13 AM, 3 BM, 5 CM; 1715/6545, Cuesta Cucho, 1 (Patterson, 1992: 23); 1751/6440, 28 km by road W of Comarapa, 6 AM, 3 MSB; 1751/6440, 25 km by road W of Comarapa, 25 UMMZ. **La Paz:** 1527/6705, río Quiquibey, 1 IE; 1528/6818, Ticunhuaya, 1 AM; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 1 TTU; 1530/6829, Cocapunco, 4 AM; 1538/6819, La Joya, 1 AM; 1539/6824, Okara, 9 AM; 1553/6752, 30 km by road N of Zongo, at cement mine, 3 UMMZ; 1556/6752, Zongo Valley, 2100 m elevation, 2 MNLP (1 not seen); 1604/6800, 18 km by road N of Zongo, Cuticucho, 1 UMMZ; 1607/6805, 0.5 km E of Saynani, 5 AM, 5 CBF, 4 MSB; 1608/6806, Saynani, 9 AM, 9 CBF, 11 MSB; 1610/6730, Yuncas, 2 BM; 1615/6750, 15 km by road NE of Unduavi, old railroad crossing, 1 UMMZ; 1616/6733, Astillero, 1 BM; 1618/6751, río Unduavi, 5 AM, 4 CBF, 3 MSB; 1618/6801, río Aceromarca, 1 km S of Yerbani, 4 UMMZ; 1619/6753, río Aceramarca, 1 CBF, 1 MSB; 1619/6752, Ñequejahuira, 26 AM; 1619/6753, rio Aceramarca, 1 MSB; 1621/6747, Pitiguaya, 2 AM. **Santa Cruz:** 1749/6441, Serranía Siberia, 11 km by road NW of Torrecillas, 3 AM, 2 MSB, 3 MNK.

Oryzomys nitidus (Thomas), 1884

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Hesperomys laticeps* var. *nitidus* was described by Thomas (1884: 452), type locality "Junin and Amable Maria," río Chanchamayo, department of Junin, Peru. *Hesperomys albigularis* was described by Tomes (1860: 264); type locality Pallatanga, province of Chimborazo, 1485 m elevation, Ecuador. In an electrophoretic study of proteins by (Dickerman and Yates, 1995: 182), *O. nitidus* was placed as a sister-species with a clade including *O. capito* and "*O. keaysi*" (= *O. levipes*). Thomas (1920c: 228) first used the name combination *Oryzomys nitidus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from Estancia Cachuela Esperanza (AM 260353–260364) and 45 km N of Yacuma (AM 262051–262052, 262054, 262056–262058).

DISTRIBUTIONAL NOTES: Common in the lowlands and up into the Yungas to at least 1985 m elevation (Monte Cantu). Known localities are listed below and mapped in figure 695.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Pregnant females were recorded in each month from June through October. Numbers of embryos were 2 (in 1 case), 3 (in 2), 4 (2), 5 (2), 6 (1), and 7 (1). Two lactating females were recorded in June. Adult females without embryos were recorded in January (1), March (1), May (2), June (3), July (5), August (2), September (3), and October (1).

Scientific synonyms relevant to Bolivian specimens are:

Oryzomys boliviae Thomas, 1901i: 536 (the second of two pages numbered 536; type locality "Mapiri, Upper Beni River, Bolivia [about 68° W. and 15° S.]. Alt. 800 m.", department of La Paz, Bolivia; also San Carlos and Chimate). Neveu-Lemaire and Grandidier, 1911: 10 (same three localities). Gyldenstolpe, 1932: 18.

Oryzomys nitidus: Gardner and Patton, 1976: 38. Musser and Williams, 1985: 17 (figure of skull from 1629/6444): 18 (figure of M2). Olds and Anderson, 1990: 72 (Estancia Cachuela Esperanza). Emmons, 1991: 73 (río Machariapo). Anderson, 1993: 36 (general distributional records). Anderson et al., 1993: 42 (vicinity of Santa Cruz de la Sierra). Dickerman and Yates, 1995: 188 (1636/6242, 1736/6336).

Oryzomys (*Oryzomys*) *boliviae*: Tate, 1932c: 17 (name combination).

Oryzomys (*Oryzomys*) *nitidus*: Anderson, 1985b: 12 (name in list).

Oryzomys albigularis: Eisenberg, 1989: 351 (undocumented mention of Bolivia—-probably based on specimens of *legatus*, *nitidus*, or *levipes* that had been misidentified in collections as *albigularis* but had not been reported in a publication under that name).

Oryzomys yunganus: Yensen et al., 1994: 407 (misidentified specimen from 1 km S of La Reserva).

LOCALITIES (103) AND SPECIMENS (508): **Beni:** 1049/6525, Guayaramerin, 1 AM; 1055/6602, 10 km NNE Riberalta on río Beni, 3 US; 1059/6606, Riberalta, 2 US; 1144/6647, boca del río Biata, 8 AM, 2 MSB; 1327/6721, río Beni, 7 AM; 1338/6525, río Yacuma, 2 km from mouth, 1 AM; 1419/6723, Reyes, 1 (Patterson, 1992: 24); 1426/6700, Mojos, Orion, 1 (Patterson, 1992: 24); 1428/6734, Rurrenabaque, 1 AM; 1430/6734, 3 km S of Rurrenabaque, 4 AM, 2 MSB; 1439/6617, Campamento Busurucucú, 1 AM; 1444/6615, Campamento 08, 2 AM, 1 CBF; 1442/6704, 45 km N of Yacuma, 12 AM, 6 MSB; 1448/6414, Casarabe, 1 AM, 1 MSB; 1448/6618, 2 km E of Campamento El Trapiche, 1 AM; 1448/6619, Campamento El Trapiche, 1 AM, 4 CBF; 1451/6535, 3.6 km NNE San Ignacio, 4 US; 1451/6617, río Matos, 6 km E of Estación Biológica del Beni, 1 MSB; 1451/6621, Estación Biológica del Beni, 2 AM; 1451/6622, río Matos, 3 IE; 1452/6707, Km 35 NW of Yucumo, 2 MSB; 1453/6536, 1 km SW San Ignacio, 2 US; 1453/6536, San Ignacio, road to airport, 2 US; 1454/6422, 6 km W of Casarabe, 1 AM; 1545/6523, Puerto San Lorenzo on río Sécure, 1 CBF; 1550/6441, 5 km NW of mouth of río Grande, 1 AM. **Cochabamba:** 1635/6645, río Cotacajes, Seque Rancho, 1 CBF; 1647/6517, Campamento Yuqui, 3 CBF; 1648/6508, Todos Santos, 2 AM; 1657/6523, 2 km E of Villa Tunari, 1 AM; 1657/6524, San Antonio, 1 AM; 1742/6442, San Mateo, 5 MACN. **La Paz:** 1333/6800, Ixiamas, Aserradero San Francisco, 3 MNLP; 1401/6731, río Beni, 3 AM; 1416/6732, río Beni, 3 AM; 1434/6828, 17 km N of Apolo, 1 CBF, 3 US; 1436/6835, río Machariapo (Emmons, 1991: 73); 1515/6810, San Ernesto, 1 BM; 1515/6810, Mapiri, 5 BM; 1524/6811, San Carlos (coordinates questionable), 1 BM; 1525/6800, Chimate, 1 BM; 1528/6752, Guanay, 5 AM; 1529/6731, 1 mi [= 1.6 km] W Puerto Linares, 7 MSU, 5 TTU; 1540/6742, 4 km NW Alcoche, 1 UMMZ; 1541/6730, Serranía Bella Vista, 1525 m, 1 MSB; 1543/6731, La Reserva, 950 m elevation, 20 AM, 6 CBF; 1544/6731, La Reserva, 840 m elevation, 22 AM, 16 CBF, 22 MSB; 1545/6731, 1 km S of La Reserva, 7 CBF; coordinates unknown, Carampioni, 1 BM. **Pando:** 1117/6855, río Nareuda, 2 AM; 1123/6712, Bella Vista, 1 AM; 1126/6734, Independencia, 1 AM; 1124/6713, La Cruz, 2 AM; 1142/6756, Palmira, 2 AM, 2 MSB; 1213/6824, Santa Rosa, 1 AM; 1223/6835, Isla Gargantua, 1 AM. **Santa Cruz:** 1420/6225, [PRBN] 2 MNK; 1433/6049, 17 km S of Campamento Los Fierros, 1 MSB; 1433/6053, Los Fierros, 2 EBD; 1438/6237, Perseverencia, 4 MNK; 1458/6332, Pajaral, 2 MNK; 1503/6245, río

Negrillo, 3 MNK; 1543/6309, 6 km by road W of Ascención, 2 AM, 1 MSB; 1550/6127, Santa Rosa de la Roca, 1 MSB; 1557/6441, 2 km N of mouth of río Chapare, 3 AM; 1600/6230, Totaitu, 1 MNK; 1623/6059, San Ignacio de Velasco, 6 US; 1629/6444, río Ichilo, 54 km S of mouth of río Chapare, 6 AM; 1632/6359, Yapacaní, 6 BM; 1635/6225, 2 km N and 10 km E of San Ramón, 2 AM, 1 MNK; 1635/6225, San Ramón, Castedo, 26 MNK; 1635/6225, 14 km NE of San Ramón, 1 AM, 1 MNK; 1635/6412, Punta Rieles, 2 AM; 1636/6242, 10 km N of San Ramón, 3 AM, 1 MSB; 1637/6246, río Quiser, 1 CM; 1647/6314, Estancia Cachuela Esperanza, 12 AM, 1 CENE, 7 MSB; 1649/6237, Palmarito, río San Julián, 9 CM; 1700/6355, Ayacucho, 1 AM; 1703/6335, 7 km N of Santa Rosa, 1 AM; 1713/6338, 6 km N of Buen Retiro, 1 AM; 1722/6302, La Abra, 18 km NE Warnes, 5 US; 1722/6325, río Surutú, province of Sara, 6 CM; 1730/6310, Warnes, 27 US; 1731/6311, Santa Rosita, 3 km SW Warnes, 2 US; coordinates unknown, Cerro Hosana, 8 CM; 1727/6340, Buenavista, 2 CM; 1733/6244, 8 km N and 1 km E of Pailón, 1 MNK; 1734/6342, 3 km N and 13.5 km W of San Rafael de Amboró, río Saguayo, 4 AM, 5 MSB, 3 MNLP; 1736/6336, San Rafael de Amboró, 18 AM, 13 MSB; 1739/6245, 3.5 km W of Estación Pailón, 8 AM, 2 MSB; 1739/6348, hunting camp at 4 km S, 13 km W San Rafael de Amboró, 1 AM; 1741/6322, Terebinto, 2 MNK; 1745/6257, Cotoca, 1 skull from owl pellet in La Paz; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 3 AM, 1 MSB; 1747/6322, 2 km SW of Las Cruces, 8 AM, 2 MNK, 3 MSB; 1748/6310, Santa Cruz de la Sierra, 1 AM, + 3 from owl pellets in La Paz; 1748/6313, 6 km W Santa Cruz, 2 US; 1752/6031, 4 km S and 24 km E of San José de Chiquitos, 1 MSB; 1753/6307, 15 km S of Santa Cruz, 2 MSB; 1758/6303, 27 km SE of Santa Cruz, 1 Hayward coll., 8 MSB; 1811/6344, 1 km NE Estancia Cuevas, 4 AM, 1 MNK, 4 MSB; 1818/5936, 4 km N and 1 km W of Santiago de Chiquitos, 4 AM, 2 MSB; 1828/6207, 8 km SE of Tita, 1 AM.

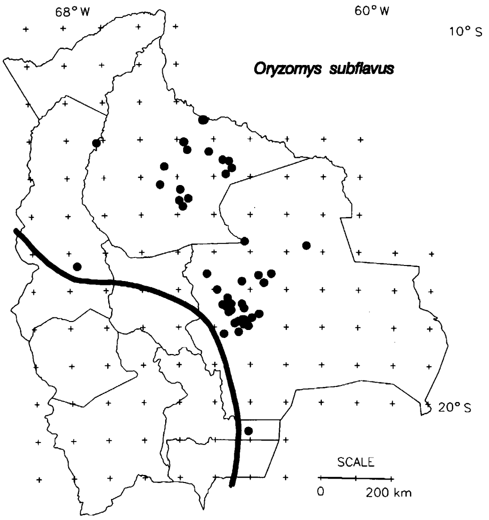


Fig. 697. Localities of known occurrence of *Oryzomys subflavus*.

Oryzomys subflavus (Wagner), 1842

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Hesperomys subflavus* was described by Wagner (1842b: 362); type locality Brasil restricted to Lagoa Santa, state of Minas Gerais, by Cabrera (1961a: 396). In a study of proteins by electrophoresis, *O. subflavus* was not in a monophyletic clade with four other species of *Oryzomys* included in the analysis (Dickerman and Yates, 1995: 182). Thus, relationships within the genus remain uncertain. *Mus buccinatus* was described by Olfers *in* Eschwege (1818: 209), type locality Achira, 250 km from San Ignacio Guazu, Paraguay. Musser and Carleton *in* Wilson and Reeder, 1993: 721, tentatively used the name *Oryzomys buccinatus* for populations in eastern Paraguay and northeastern Argentina that may on further study prove to be conspecific with *O. subflavus*. Perhaps the Bolivian material here referred to *O. subflavus* is involved in this unresolved taxonomic problem.

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from San Miguel Rincón (AM 260385–260389, MSB 55343–55346).

Distributional Notes: Most localities are in the lowlands (below 500 m elevation), but one record in La Paz (Pitiguaya) is at 1785 m. Known localities are listed below and mapped in figure 697.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

PARASITOLOGY: Brennan (1970: 811) reported the chigger, *Eutrombicula batatas*, from the mouth of the Baures River.

REPRODUCTION: Pregnant females recorded from June and September. Numbers of embryos were two (in one case) and four (in two cases).

Scientific synonyms used for Bolivian specimens are:

Oryzomys (*Oryzomys*) *subflavus*: Anderson, 1985b: 12 (name in list).

Oryzomys subflavus: Brennan, 1970: 811 (chiggers, 1230/6418). Anderson, 1993: 36 (general distributional records). Anderson et al., 1993: 43 (vicinity of Santa Cruz de la Sierra). Dickerman and Yates, 1995: 188 (1723/6332). Steppan, 1995: 111 (AM 210024–210027, from 1229/6417, 1230/6418).

LOCALITIES (56) AND SPECIMENS (320): **Beni:** 1229/6417, río Iténez, opposite Costa Marques [Brazil], 2 AM; 1230/6415, Pampa de Meio, 1 AM; 1230/6418, mouth of río Baures, 2 AM; 1304/6449, San Joaquín, 155 FM, 31 US; 1304/6448, Camino Vilches, 2 FM; 1304/6711, río Beni, 1 AM; 1317/6443, San Ramón, 1 FM; 1320/6408, Magdalena, 7 FM, 1 US; 1333/6345, Huacaraje, 1 FM; 1335/6335, Baures, 2 FM; 1343/6521, Puerto Caballo on río Mamoré, 7 AM; 1346/6330, Lago Victoria, 2 FM; 1356/6340, El Carmen, 1 FM; 1412/6528, Fortaleza, 95 km S Santa Ana, Ykuma province, 2 US; 1420/6455, 10 km W San Pedro on río Mamoré, 2 AM; 1434/6442, 23 km W San Javier on río Mamoré, 1 AM; 1437/6457, mouth of río Ibare, 1 AM; 1447/6451, Puerto Almacen, 2 AM; coordinates unknown, Santo Dios, 1 FM; coordinates unknown, Tapera Jorillo, 2 FM; coordinates unknown, Centenela, 14 FM. **Chuquisaca:** 2046/6303, 3.8 km by road E of Carandayti, 1 AM. **La Paz:** 1621/6747, Pitiguaya, 7 AM. **Santa Cruz:** 1543/6309, 6 km by road W of Ascención, 1 AM; 1550/6127, Santa Rosa de la Roca, 1 AM, 1 MSB; 1635/6225, San Ramón, Castedo, 2 MNK; 1635/6412, Puenta Rieles, 2 AM, 2 CENETROP; 1637/6246, río Quiser, 1 CM; 1647/6314, Estancia Cachuela Esperanza, 3 AM; 1649/6237, Palmarito, río San Julián, 1 CM; 1700/6355, Ayacucho, 2 AM; 1713/6338, 6 km N of Buen Retiro, 2 AM; 1722/6333, río Palometillo, 1 BM; 1723/6314, 3 km SE Montero, 1 km N of Villa Copacabana, 1 AM; 1723/6332, San Miguel Rincón, 5 AM, 4 MSB; 1724/6344, 7 km N and 17 km W Buenavista, 1 AM; 1724/6346, 25 km by road W of Buena Vista, 1 UMMZ; 1727/6340, Buenavista, 7 BM, 1 FM; 1730/6310, Warnes, 2 US; 1733/6332, 2 km S of Caranda, 2 MSB; 1736/6336, San Rafael de Amboró, 2 AM, 1 MSB; 1739/6245, 3.5 km W of Estación Pailón, 2 AM; 1745/6257, Cotoca, one skull from owl pellet in La Paz; 1748/6310, Santa Cruz, 1 US, plus 3 from owl pellets in La Paz; 1748/6313, 6 km W Santa Cruz, 2 US; 1751/6309, El Palmar, province of Ibáñez, 2 US; 1751/6320, Ayacucho, 1 US [note that there are specimens from two different Ayacuchos in Santa Cruz]; 1753/6307, 15 km S of Santa Cruz, 1 AM, 1 MNK; 1754/6326, 15 km SW Santa Cruz, 2 US; 1756/6311, 12 km S and 8 km E of Santa Cruz, 1 AM; 1758/6303, 27 km SE of Santa Cruz, 2 MSB; 1808/6319, Basilio, province of Cordillera, 1 US; 1811/6344, 1 km NE Estancia Cuevas, 1 AM, 2 MSB; coordinates unknown, "Rio Grande Bolivie," 1 (Inst. Roy. Sc. Nat. Belgique); coordinates unknown, Ibáñez, 1 US. **Department unknown:** coordinates unknown, 52 km S San Ramón, 1 (Inst. Roy. Sc. Nat. Belgique); "Bolivia" only, 1 BM.

Oryzomys yunganus Thomas, 1902

MORPHOLOGICAL CHARACTERS AND COMPARISONS: According to Gardner and Patton (1976: 40), *Oryzomys yunganus* is "nearly identical with *O. capito*, especially externally, but may be distinguished by the comparatively narrow incisive foramina and the presence of an enamel island in the second upper molars separating the first primary and major folds." The enamel island was figured by Musser and Williams (1985: 18). *Oryzomys yunganus* has chromosomal differences from *O. capito* also (Gardner and Patton, 1976: 5). Karyotypic variants with $2n = 60$ and 58 were contrasted with a $2n$ of 52 in *O. capito*—all specimens being from Peru.

According to Musser and Williams (1985: 19), *O. yunganus* differs from *O. capito* in having the enamel island in M2. Both *O. yunganus* and *O. capito* differ from *O. niti-*

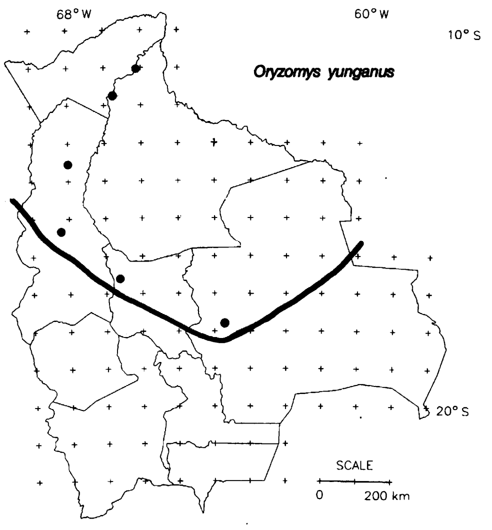


Fig. 698. Localities of known occurrence of *Oryzomys yunganus*.

dus in lacking a sphenofrontal foramen and squamoso-alisphenoid groove and in having dark, flat tones in the dorsal pelage and a monocolored tail, rather than bright tawny pelage and a bicolored tail. An alisphenoid strut also is absent, in contrast to *O. nitidus* where it usually occurs.

Measurements in tables 18 and 20 are of specimens from Bellavista (BM 1.1.1.65) and Charuplaya (BM 2.1.1.39).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 698.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Oryzomys yunganus Thomas, 1902a: 130 (type locality Charuplaya, "rio Secure," department of Cochabamba, Bolivia); Neveu-Lemaire and Grandidier, 1911: 10. Gyldenstolpe, 1932: 19. Anderson, 1993: 36 (general distributional records).

Oryzomys (*Oryzomys*) *yunganus*: Tate, 1932c: 17.

Oryzomys capito yunganus: Cabrera, 1961a: 387.

Oryzomys (*Oryzomys*) *capito yunganus*: Anderson, 1985b: 12 (this name in a list referred in part to *O. yunganus*, *capito* and *yunganus* not then being recognized as separate species).

LOCALITIES (8) AND SPECIMENS (11): **Beni:** 1144/6647, boca del rio Biata, 4 AM. **Cochabamba:** 1636/6637, Charuplaya, 1 BM. **La Paz:** 1333/6800, Ixiamas, Aserradero San Francisco, 1 MNLP; 1520/6813, Bellavista. **Pando:** 1102/6607, Las Piedras, 1 AM. **Santa Cruz:** 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, Río Pitasama, 2 AM, 1 MSB.

Oryzomys, species not determined

LOCALITIES (52) AND SPECIMENS (107): **Beni:** 1048/6526, 1 km NW Guayaramerin, 6 AM; 1048/6526, 1.5 km NW Guayaramarin, 5 AM; 1149/6506, 7 km N Lagoinha on río Mamoré, 1 AM; 1213/6513, Cascajal, 1 AM; 1229/6418, 1.5 km below Costa Marques [Brazil], 1 AM; 1232/6509, 17 km NNW Nuevo Berlin, 1 AM; 1315/6449, Totai, 1 US; 1343/6521, Puerto Caballo, 1 AM; 1335/6520, río Mamoré, 2 AM; 1415/?, Monte Grande, 1 IML; 1447/6451, río Ibare, 26 km from mouth, 1 AM; 1450/6623, Beni Reserve, río Curiaba, 1 MNLP; 1451/6621, Porvenir, 1 MNLP. **Chuquisaca:** 1927/6407, Tomina Province, Tola Orko, 40 km from Padilla, 3 US; 1931/6409, Monte Cantu, Chullpar, province of Tomena, 2 US. **Cochabamba:** 1558/6442, mouth of río Chapare, 1 ANSP [19405]; 1620/6645, Yungas de Cochabamba, 1 BM; 1636/6637, Charuplaya, 1 BM; 1640/6603, Mosetenes, 1 BM; 1647/6457, Campamento Yuqui, 1 MNLP; 1657/6523, 2 km E Villa Tunari, 2 AM; 1706/6529, El Palmar, 1 ANSP [19460], 2 FM; 1711/6549, Chapare, 1 FM (from BM); 1714/6541, Incachaca, 4 ANSP, 2 BM; 1734/6621, Parotani, 1 FM [21668]; 1740/6446, Calahuasi, 1 IML; 1745/6502, 17 km E of Totora, Tinkusiri, 2 [collection uncertain]. **La Paz:** 1315/6718, río Beni, 2 AM; 1333/6800, Ixiamas, Aserradero San Francisco, 2 MNLP; 1401/6731, río Beni, 4 MSB; 1416/6732, río Beni, 1 MSB; 1515/6810, Mapiri, 1 AM; 1620/6756, Pongo, 8 AM; 1621/6747, Pitiguaya, 1 AM; 1624/6731, Chulumani, 1 BM; 1630/6809, La Paz, 1 BM. **Pando:** 1128/6750, 15 km NO de [= NW of] Puerto Camacho, 4 CBF. **Santa Cruz:** 1550/6127, Santa Rosa de la Roca, 1 [JLC 2103]; 1623/6059, San Ignasio de Velasco, 1 US; 1623/6059, Velasco, 1 US; 1628/6444, río Ichilo, 52 km S of mouth of río Chapare, 1 AM; 1724/6346, río Yapacaní, 1 FM; 1727/6340, Buenavista, 2 FM, 4 MACN (not seen); 1736/6336, San Rafael de Amboró, 3 AM; 1747/6322, 3 km SW Las Cruces, 4 MNK, 1 MSB; 1754/6434, 5 mi [= 8 km] W Comarapa, 1 MVZ; coordinates unknown, Nueva Moka, 2 MACN (not seen); 1927/6221, Cerro Colorado, 1 EBD (not seen). **Tarija:** 2115/6330, Villa Montes, 3 ZFMK (R. M. Wetzel, personal commun.); 2132/6412, Entre Ríos, 1 US; 2202/6345, Yacuiba, 3 (Thomas, 1925); 2216/6433, 3 km SE of Cuyambuyo, 1 MSB; **Department unknown:** "Bolivia" only, 2 FM.

Genus *Rhipidomys* Tschudi, 1844

The vernacular names Climbing Rat or Rata Arboricola have been used for species of this genus. However, other genera also include rats that climb.

Rhipidomys couesi
(Allen and Chapman), 1893

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Tylomys couesi* was described by Allen and Chapman (1893: 211), type locality "Princestown," island of Trinidad. *Rhipidomys austrinus* was described by Thomas (1921c: 183), type locality "Sunchal, 1200 m." in the Sierra de Santa Barbara, Jujuy, Argentina. Musser and Carleton (*in* Wilson and Reeder, 1993: 744) recognized *Rhipidomys austrinus* as a separate species. Until a critical revision of the genus is published, uncertainty remains as to whether populations represented by Bolivian material intergrade with *R. couesi*, as postulated here, or with *R. leucodactylus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from Taringuity (UM 155866, 155867), 4 km N of Cuyambuyo (UM 155864–155865), Itau (BM 25.2.1.39, holotype of *collinus*), and Chijchipani (AM 262991–262992, 263134–263137, 263142–263143, 263145, 263155, 263158—263160, 263163), and Florida (FM 72881).

DISTRIBUTIONAL NOTES: Known localities are all in or near the Yungas. These localities are listed below and mapped in figure 699.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

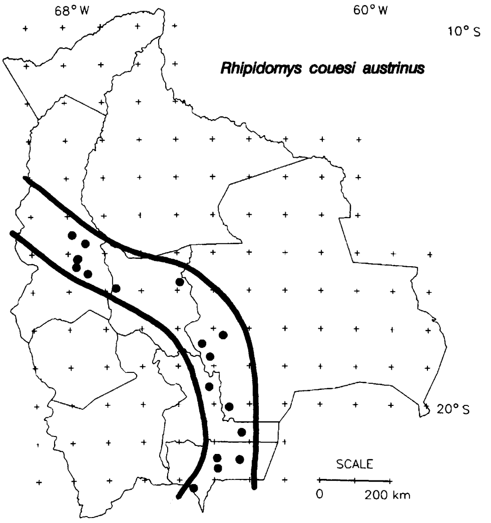


Fig. 699. Localities of known occurrence of *Rhipidomys couesi austrinus*. Taxonomic status uncertain.

REPRODUCTION: One female taken in May had two embryos.

Scientific synonyms used for Bolivian specimens are:

Rhipidomys couesi austrinus
Thomas, 1921

Rhipidomys collinus Thomas, 1925: 578 (type locality "Sierra Santa Rosa, 1000 m." in Tarija, Bolivia). Gyldenstolpe, 1932: 44.

Rhipidomys leucodactylus collinus: Cabrera, 1961a: 421 (use of name combination). Anderson, 1985b: 12 (name in list).

Rhipidomys couesi: Anderson, 1985b: 12 (name in list). Voss, 1991: 112 (absence of gall bladder in two specimens from Chijchipani). Steppan, 1995: 112 (AM 263919, río Limón).

Rhipidomys couesi austrinus: Anderson, 1993: 36 (general distributional records).

LOCALITIES (20) AND SPECIMENS (72): **Chuquisaca:** 1933/6408, Río Limón, 1 AM, 1 MNLP, 1 MSB; 2005/6334, Camiri, 5 km S Choreti, province of Azero, 5 US; 2045/6313, Porvenir, 1 AM, 1 MSB. **Cochabamba:** 1647/6456, Campamento Yuqui, 1 CBF; 1656/6642, Choro, province of Ayopaca, 2 FM. **La Paz:** 1530/6753, Chimasi, 2 BM; 1544/6731, La Reserva, 1 CBF; 1608/6744, Chijchipani, 25 AM, 5 MNLP, 1 MSB; 1609/6745, Chijchijpa, 1114 m elevation, 1 AM;

1621/6747, río Unduavi, La Florida, Pitiguaya, 1 UMMZ; 1621/6747, Pitiguaya, 6 AM; 1632/6728, Lavi Grande, Campamento Qhana, 1 CBF. **Santa Cruz:** 1811/6344, 1 km NE Estancia Cuevas, 1 AM, 1 MNK; 1824/6419, 7 km by road SE of Ariruma, 1 AM; 1845/6406, La Hoyada, 30 km S Valle Grande, 1 MVZ; coordinates unknown, Florida, near Floripondio, 3 FM. **Tarija:** 2126/6355, Tapecua, 1 AM, 2 MSB, 1 CBF; 2128/6317, 35 km by road SE of Villa Montes, Taringuiti, 2 UMMZ; 2142/6354, Itau, Sierra Santa Rosa, 1 BM (Thomas, 1925); 2213/6436, 4 km by road N of Cuyambuyo, 2 UMMZ.

Rhipidomys leucodactylus (Tschudi), 1845

Rhipidomys leucodactylus rex Thomas, 1927

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Hesperomys (Rhipidomys) leucodactylus* was described by Tschudi (1845: 183, pl. 13); type locality eastern Peru restricted by Cabrera (1961a: 421) to "alto Huallaga." *Rhipidomys rex* was described by Thomas (1927b: 600); type locality "Chinchaviti, 3000'", Huanuco, Peru. The genus needs critical revision.

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from Peru (BM 34.9.2.172, holotype of *rex*) and Yungas de Cochabamba (BM 27.11.1.125).

Distributional Notes: Known localities, all in the Yungas, are listed below and mapped in figure 700.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

The only scientific name used for Bolivian specimens is:

Rhipidomys leucodactylus rex: Anderson, 1993: 36 (general distributional records).

Localities (4) and Specimens (4): **Cochabamba:** 1620/6645, Yungas de Cochabamba, 1 BM; 1706/6533, El Palmar, río Cochi Mayu, 1 AM; 1717/6515, río Yanimayo, 35 km N of Monte Punco, 1 IML. **La Paz:** 1628/6728, Irupana, 1 IE.

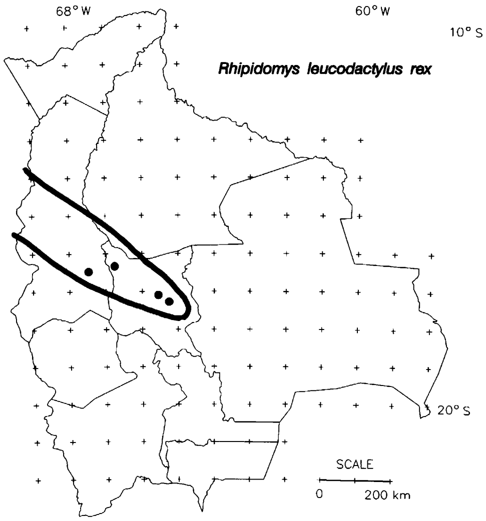


Fig. 700. Localities of known occurrence of *Rhipidomys leucodactylus rex*. Taxonomic status uncertain.

Rhipidomys nitela Thomas, 1901

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Rhipidomys nitela* was described by Thomas (1901d: 148), type locality "Kanuku Mountains, British Guiana" or Kwaiamatta, montes Kanuku, Guyana, 72 m elevation). Although further taxonomic revision may show that the Bolivian specimens are not *R. nitela*, I judge that there are at least three species of *Rhipidomys* in Bolivia, and these specimens represent the smallest of the three.

Morphological Characters and Comparisons: Measurements in table 18 are of specimens from Alto Palmar (AM 119406) and 30 km N of Zongo (UM 156298).

Distributional Notes: The three known localities are all in the Yungas. These localities are listed below and mapped in figure 701.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

The only scientific name used for Bolivian specimens is:

Rhipidomys nitela: Anderson, 1993: 36 (general distributional records).

Localities (3) and Specimens (3): **Cocha-**

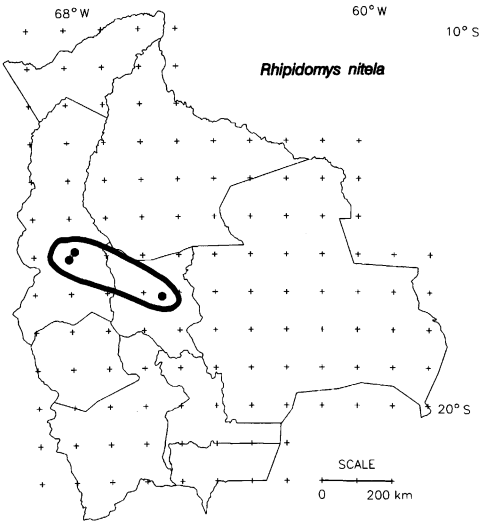


Fig. 701. Localities of known occurrence of *Rhipidomys nitela*. Taxonomic status is uncertain; the type locality is in Guyana.

bamba: 1706/6529, Alto Palmar, Chapare, 1 AM. **La Paz:** 1553/6752, 30 km by road N of Zongo, 1 UMMZ; 1605/6802, "Cha pata" [the space represents illegible letters on the specimen label], 1 MNLP.

Rhipidomys, species not determined

Localities (5) and Specimens (7): **Cochabamba:** 1706/6533, El Palmar, río Cochi Mayu, 1 MSB; 1713/6552, Corani, 1 AM, 1 CBF, 1 MSB. **La Paz:** 1607/6805, 0.5 km E of Saynani, 1 AM. **Santa Cruz:** 1808/6312, 7 km E and 3 km N Ingeniero Mora, 1 AM; 1634/6135, Molino (Zabacal), 1 US.

Genus *Thomasomys* Coues, 1884

Taxonomic Remarks: The genus needs critical revision.

Thomasomys aureus aureus (Tomes), 1860

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *H*[*esperomys*]. *aureus* was described by Tomes (1860: 219), type locality Pallatanga, province of Chimborazo, Ecuador. Cabrera (1961a: 425) used the name combination *Thomasomys aureus aureus*.

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from río Aceramarca (AM 72109–72111), Choro (FM 74865), 15 km NE of Unduavi (UM 155878), and 28 km W of Comarapa (AM 260422).

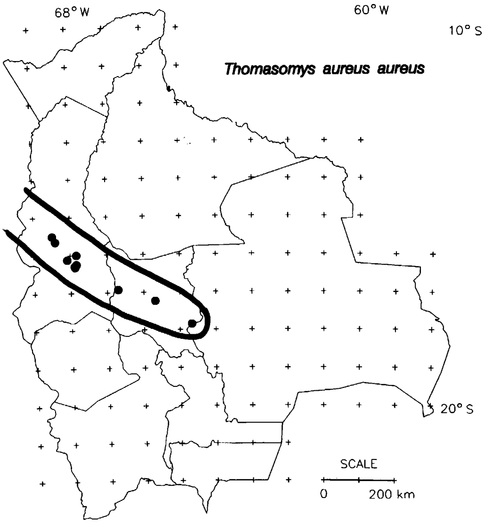


Fig. 702. Localities of known occurrence of *Thomasomys aureus aureus*.

Distributional Notes: Known localities, all in the Yungas, are listed below and mapped in figure 702.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Thomasomys aureus aureus: Anderson, 1985b: 12 (name in list). Anderson, 1993: 37 (general distributional records).

Thomasomys aureus: Steppan, 1995: 109 (AM 260422, 1751/6440).

Localities (11) and Specimens (20): **Cochabamba:** 1656/6642, Choro, province of Ayopaca, 1 FM; 1714/6541, Incachaca, 2 AM, 1 CM (5260); 1751/6440, 28 km by road W of Comarapa, 1 AM. **La Paz:** 1530/6829, Cocapunco, 2 AM; 1539/6824, Okara, 3 AM; 1600/6750, Calabetea, 1 MNLP; 1607/6805, 0.5 km E of Saynani, 1 AM, 1 MSB; 1615/6750, 15 km by road NE of Unduavi, 1 UMMZ; 1618/6753, río Aceramarca, 3 AM; 1619/6752, Ñequejahuira, 2 AM. **Santa Cruz:** coordinates unknown, Agua Hedionda, 1 MACN.

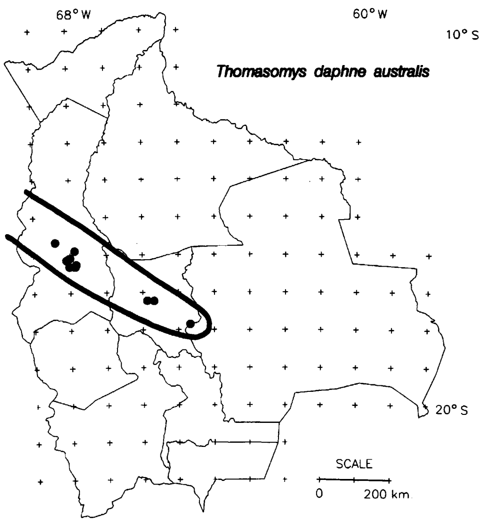


Fig. 703. Localities of known occurrence of *Thomasomys daphne australis.*

Thomasomys daphne Thomas, 1917

No truly vernacular name. Source of the name *daphne* was not noted in the original publication.

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Thomasomys daphne* was described by Thomas (1917c: 2), type locality Ocabamba Valley, 9100 ft, Cuzco Department, Peru.

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from río Aceramarca (UM 155894, 156156–156157, 156194–156197), Incachaca (AM 38550, holotype of *australis*).

Distributional Notes: Known localities, all in the Yungas, are listed below and mapped in figure 703.

Habitat: Known only from rocky and wooded valleys in the upper part of the Yungas.

No detailed Bolivian data are available on habits, behavior, or food.

Reproduction: Four pregnant females taken in October had one embryo (one case) and three embryos (three cases). A lactating female was recorded in June.

Scientific synonyms used for Bolivian specimens are:

Thomasomys daphne australis Anthony, 1925

Thomasomys daphne australis Anthony, 1925: 2 (type locality "Incachaca, 7000 feet, Prov. Cochabamba, Bolivia.") Lawrence, 1993: 101 (Incachaca). Gyldenstolpe, 1932: 58. Anderson, 1985b: 12 (name in list). Anderson, 1993: 37 (general distributional records).

Thomasomys daphne: Voss, 1991: 112 (presence of gall bladder in two specimens from río Aceramarca). Steppan, 1995: 112 (UMMZ 155894, 1618/6801).

Localities (12) and Specimens (44): **Cochabamba:** 1713/6552, Corani, 1 AM, 1 MSB; 1714/6541, Incachaca, 1 AM. **La Paz:** 1539/6824, Okara, 1 AM; 1553/6752, 30 km by road N of Zongo, 7 UMMZ; 1604/6800, 18 km by road N of Zongo, 10 UMMZ; 1607/6805, 0.5 km E of Saynani, 1 CBF; 1608/6806, Saynani, 1 AM; 1615/6750, 15 km by road NE of Unduavi, 6 UMMZ; 1618/6751, río Unduavi, 1 CBF, 1 MSB; 1618/6753, río Aceramarca, 2 AM; 1618/6801, río Aceramarca, 1 km S Yerbani, 8 UMMZ. **Santa Cruz:** 1751/6440, 25 km by road W of Comarapa, 3 UMMZ.

Thomasomys ladewi Anthony, 1926

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from río Aceramarca (AM 72113, holotype; 72114), 1 km S of Yerbani (UM 156294).

Distributional Notes: Known only from the valley of the río Unduavi and its tributary the río Aceramarca. Localities are listed below and mapped in figure 704.

Habitat: Rocky and wooded hillsides.

No detailed Bolivian data are available on habits, behavior, food, or reproduction.

The only scientific name used for Bolivian specimens is:

Thomasomys ladewi Anthony, 1926, pl. 1 (type locality "Rio Aceramarca, northeast of La Paz, altitude 10,800 feet"). Tate, 1932e: 22. Gyldenstolpe, 1932: 54. Anderson, 1985b: 12 (name in list). Anderson, 1993: 37 (type locality only). Lawrence, 1993: 100 (río Aceramarca).

Localities (4) and Specimens (12): **La Paz:** 1618/6751, río Unduavi, 1 MSB; 1618/6753, río Aceramarca, 2 AM; 1618/6801, río Aceramarca, 1 km S of Yerbani, 1 UMMZ;

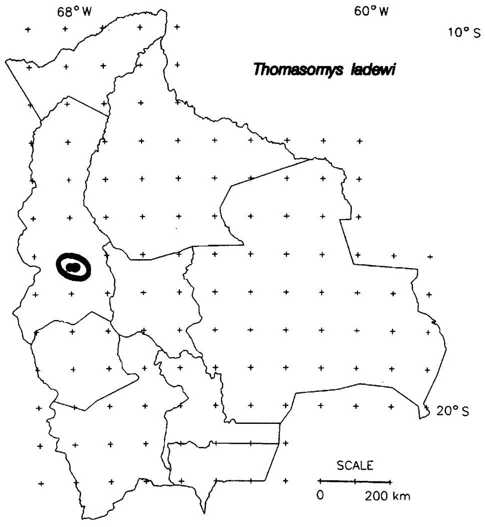


Fig. 704. Localities of known occurrence of *Thomasomys ladewi.*

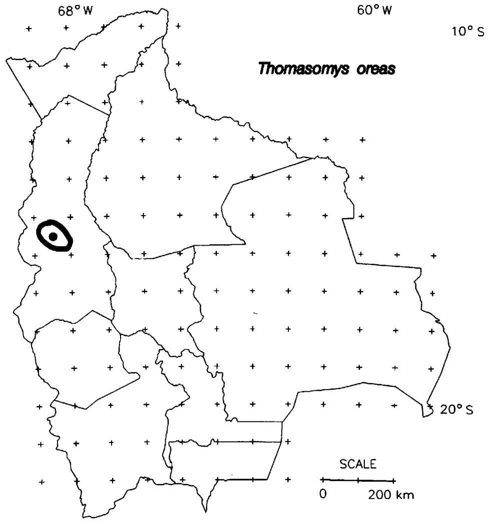


Fig. 705. Localities of known occurrence of *Thomasomys oreas.*

1619/6753, río Aceromarca, 4 AM, 2 CBF, 2 MSB.

Thomasomys oreas Anthony, 1926

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from Cocapunco (AM 72129–72130).

DISTRIBUTIONAL NOTES: Known only from the type locality, mapped in figure 705.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

The only scientific name used for Bolivian specimens is:

Thomasomys oreas, Anthony, 1926: 2 (type locality "Cocopunco, about 80 miles north of La Paz, Bolivia, altitude 10,000 feet"). Tate, 1932e: 22. Gyldenstolpe, 1932: 56. Anderson, 1985b: 12 (name in list). Anderson, 1993: 37 (type locality only). Lawrence, 1993: 100 (Cocopunco).

LOCALITIES (1) AND SPECIMENS (2): **La Paz:** 1530/6829, Cocapunco, 2 AM.

Thomasomys taczanowskii
Thomas, 1882

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Hesperomys* (*Rhipidomys*) *taczanowskii* was described by Thomas (1882: 109); type locality "Tambillo, 5800'" on the río Malleta, Cajamarca District, Peru. The identification of the two Bolivian specimens reported here is quite tentative. They do seem to be different from the other species of Bolivian *Thomasomys*. However, I have not personally compared these two specimens with either the holotype or other specimens supposed to belong to the species *T. taczanowskii*, nor with specimens of *T. notatus* from Cuzco department.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Cranial measurements for two males (FM 74866 and 74867) are occipitonasal length, 25.9 mm and 28.1; alveolar length of upper molar tooth row, 4.2 mm and 4.1, and posterior zygomatic breadth, 13.8 mm and 14.8. External measurements are in table 18.

DISTRIBUTIONAL NOTES: The only known Bolivian locality is noted below and mapped in figure 706.

No detailed Bolivian data are available on habits, behavior, food, or reproduction.

The only scientific name used for Bolivian specimens is:

Thomasomys taczanowskii: Anderson, 1993: 37 (referring to Choro).

LOCALITIES (1) AND SPECIMENS (2): **Cocha-**

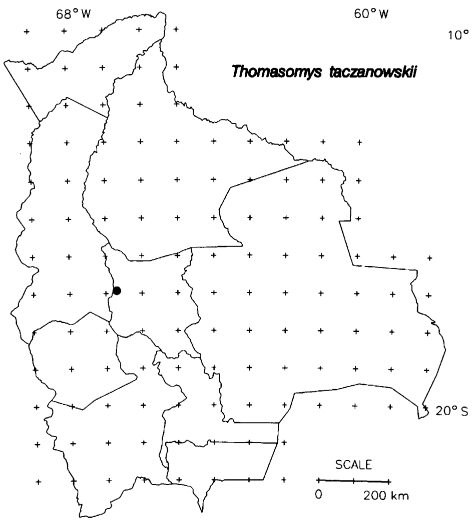


Fig. 706. Locality of known occurrence of *Thomasomys taczanowskii*. Taxonomic status uncertain.

bamba: 1656/6642, Choro, province of Ayopaca, 2 FM.

Thomasomys, species not determined

Thomasomys sp?: Anderson, 1985b: 12 (name in list).

LOCALITIES (4) AND SPECIMENS (4): **Cochabamba:** 1714/6541, Incachaca, 1 CM (5084); 1721/6543, Cuchacancha, 1 AM; 1751/6442, 30 km by road W of Comarapa, 1 AM (263183). **Santa Cruz:** coordinates unknown, Agua Hedionda, 1 MACN (not seen).

The specimen from 1751/6442 consists of fragments of a skull from a fecal pellet of a carnivore; perhaps of some species not recorded previously for Bolivia. *Thomasomys auricularis*, *T. pyrrhonotus*, or something similar, were suggested by G. G. Musser (personal commun.).

TRIBE AKODONTINI VORONTSOV, 1959

TAXONOMIC REMARKS: Steppan (1995: 60) wrote that "the phyllotines are members of a tetralophodont tribal-group that includes the akodontines, scapteromyines, and *Punomys*." Genera of Akodontini represented in Bolivia are *Akodon*, *Bolomys*, *Chroeomys*, *Lenoxus*, and *Oxymycterus*. The tribe was diagnosed by Reig (1987: 364). "The cohesiveness and integrity of the Akodontini as a tribe" was subsequently reaffirmed on the basis of additional evidence from allozyme genetic distances (Apfelbaum and Reig, 1989: 271). Phylogenetic relationships have been examined by study of cytochrome *b* (Smith and Patton, 1991) and by study of mitochondrial DNA (Smith and Patton, 1993). Based on the available mitochondrial data, the authors wrote that "it is not possible to conclude with confidence that the tribe Akodontini is a monophyletic unit."

Genus *Akodon* Meyen, 1833

TAXONOMIC REMARKS: Gray and Gray (1847: 42) reported three specimens from "Bolivia" in the Bridges's collection as "Mus (Abrothrix) arenicola?" and these may be of the genus *Akodon*, but their identity is uncertain.

There has been and there remains some taxonomic uncertainty in regard to the dark *Akodon* inhabiting the Bolivian Yungas. Thomas (1894b: 363) regarded *Akodon mollis* of Peru as "the northern representative of *A. olivaceus*, which ranges over Bolivia, Chili, and Patagonia . . . ." *Akodon mollis* was said to have the same size and color, but longer tail and broader interorbital area. As currently understood, *Akodon mollis* does not extend south as far as Bolivia and *Akodon fumeus* is a distinct species (Myers and Patton, 1989b: 17).

PARASITOLOGY: Fonseca (1960: 94, 98) reported ticks (Laelaptidae, *Cavilaelaps bresslaui*, and *Eubrachylaelaps rotundus*) from *Akodon mollis* from Novillos, 1830 m elevation (coordinates unknown). Without voucher specimens for the host, the identification cannot be verified.

Akodon aerosus Thomas, 1913

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. Thomas (1913c: 406) proposed the new species *Akodon aerosus* (type locality "Mirador, Banos, Ecuador. Alt. 1500 m.", upper río Pastaza) for specimens he had earlier (Thomas, 1894b: 356) erroneously referred to *Akodon caliginosus*, but which were not the same as *Hesperomys caliginosus* of

Tomes (an *Oryzomys*). *Akodon aerosus baliolus* was described by Osgood (1915: 192), type locality río Inambari, Inca Mines, Peru.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: *Akodon aerosus* was described originally as a large dark species practically indistinguishable externally from *Oryzomys* (*Melanomys*) *caliginosus*. Pelage is "dark bistre-brown" above and a little paler below; ears, forefeet, hind feet, and tail are blackish brown. The skull and teeth of *A. aerosus* were said to be those of a true *Akodon*: broad interorbital region; smooth and unbeaded supraorbital ridges; evenly convex upper profile; anterior edge of zygomatic plate slightly concave; and palatal foramina long, widely open, and with smoothly rounded edges. Some measurements were given as head and body, 108 mm; tail, 75; hind foot, 24 [without claw?]; ear, 16 [from crown rather than notch?]; greatest length of skull, 29.3; condyloincisive length, 26.8; zygomatic breadth, 15; nasal length, 11; interorbital breadth, 6; width of braincase, 13; palatilar length, 12.1; length of palatilar foramina, 6.6; and length of upper molar series, 4.9.

"Distinguished from members of the *varius* group by its broad and generally rounded interorbital region, absent or weak temporal ridges, shallow and laterally compressed zygomatic notches, weak zygomatic arches that do not flare laterally, and narrow zygomatic plate with the dorsal root often posterior to the ventral root" (Myers, 1990: 18).

Measurements in tables 18 and 20 are of specimens from Yungas (AM 38616—38623) and Chulumani (BM 1901.6.7.49 to 53).

DISTRIBUTIONAL NOTES: Known localities are in or near the Yungas. These localities are listed below and mapped in figure 707.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Sixteen females, all taken in July, have data; 14 of these had no embryos, one had placental scars showing recent pregnancy, and one had four embryos.

Scientific synonyms used for Bolivian specimens are:

Akodon aerosus baliolus Osgood, 1915

Akodon aerosus baliolus: Anderson, 1993: 37 (general distributional records).

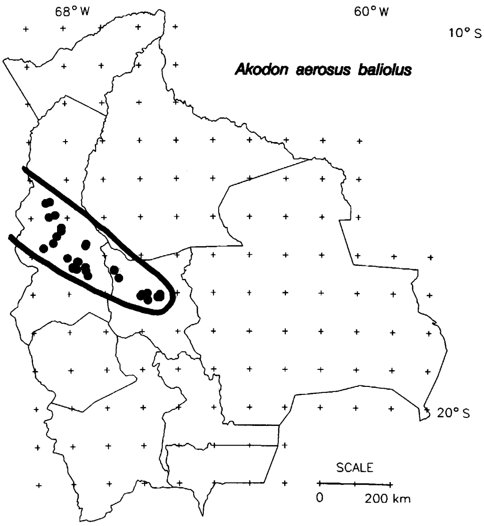


Fig. 707. Localities of known occurrence of *Akodon aerosus baliolus*.

Akodon caliginosus: Thomas, 1901a: 189 (Mapiri); 1902a: 138 (Charuplaya). Neveu-Lemaire and Grandidier, 1911: 13 (Charuplaya, Mapiri).

Akodon aerosus aerosus: Sanborn, 1950: 14 (Chapare, Ñequejahuira, Okara, Pitiguaya, Ticunhuaya).

Oryzomys (*Melanomys*) *caliginosus caliginosus*: Anderson, 1985b: 12 (name in list).

Akodon urichi aerosus: Anderson, 1985b: 12 (name in list).

Akodon aerosus: Myers and Patton, 1989a: 26; 1989b: 23 (Ñequejahuira, Okara, Pitiguaya). Myers, 1990: 18 (eastern slopes of Bolivian Andes). Myers et al., 1990: 103 (same three localities). Emmons, 1991: 72 (Calabatea and río Machariapo).

LOCALITIES (37) AND SPECIMENS (206): **Cochabamba:** 1620/6645, Yungas de Cochabamba, 1 BM (34.9.2.148); 1636/6637, Charuplaya, 9 BM (1902.1.1.81 to 88, 1902.2.2.131); 1700/6550, yungas, 16 AM; 1702/6529, 3 km SW Villa Tunari, 1 AM [244651]; 1702/6559, 9.4 km by road N of Tablas Monte, 4 AM, 1 CBF, 1 MSB; 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 1 CBF, 1 MSB; 1704/6601, 4.4 km by road N of Tablas Monte, 10 AM, 1 CBF, 9 MSB; 1706/6529, Bajo Palmar, Chapare, 2 AM; 1706/6529, Alto Palmar, Chapare, 2 AM; 1706/6529, Palmar, yungas de Cochabamba, 2 ANSP; 1706/6529, El Palmar, province of Chapare, 2 FM;

1706/6533, El Palmar, río Cochi Mayu, 1 AM; 1711/6549, Chapare, 2 FM, 6 BM (2 unregistered). **La Paz:** 1434/6828, 17 km N of Apolo, 1 USNM; 1436/6835, río Machariapo (Emmons, 1991: 73); 1455/6820, 50 km W of Apolo, 1 CBF; 1458/6830, Calabatea (Emmons, 1991: 73); 1515/6810, Mapiri, 2 AM, 3 BM (01.1.1.83 to 85); 1520/6810, Bellavista, 1 BM (01.1.1.82); 1528/6818, Ticunhuaya, 8 AM; 1539/6824, Okara, 18 AM; 1541/6730, Serranía Bella Vista, 1525 m elevation, 3 AM, 1 CBF, 4 MSB; 1544/6731, La Reserva, 840 m elevation, 10 AM, 11 CBF, 3 MSB; 1547/6840, Sorata, base of Mt. Sorata, 1 AM; 1603/6801, Zongo, 1600 m elevation, 1 MNLP; 1609/6744, Chijchijpa, 1224 m elevation, 1 AM, 1 MSB; 1609/6745, Chijchijpa, 1114 m elevation, 2 AM, 2 CBF, 6 MSB; 1618/6732, río Solocama, 14 km S of Chulumani, 1 CBF; 1618/6748, Chuspipata, 1 CBF; 1618/6751, río Unduavi, 1 AM, 1 CBF, 1 MSB; 1618/6753, río Aceramarca, 1 AM; 1619/6753, río Aceromarca, 2 km E and 1 km S of Viejo Unduavi, 1 CBF; 1619/6752, Ñequejahuira, 13 AM; 1621/6746, río Unduavi, La Florida, Pitiguaya, 1 UMMZ; 1621/6747, Pitiguaya, 26 AM; 1624/6731, Chulumani, 5 BM; 1632/6728, Lavi Grande, Campamento Qhana, 1 CBF. **Department unknown:** Bolivia only, 1 BM.

Akodon albiventer Thomas, 1897

White-bellied Grass Mouse,
Raton Ventriblanco

Taxonomic Remarks: Thomas (1926d: 195) and Ellerman (1941) placed *A. albiventer* in the subgenus *Bolomys*, but this assignment is not currently accepted. One name used for Bolivian specimens has its type locality outside of Bolivia. *Akodon albiventer* was described by Thomas (1897a: 217), type locality "Lower Cachi" River, Salta Province, Argentina. *Akodon Berlepschii* was described by Thomas (1898a: 281) from Bolivia. Subsequently (Thomas, 1902b: 226), he noted "that it is by no means improbable that the two [*albiventer* and *berlepschii*] will be found to intergrade completely" and that "the difference between the two forms narrows itself down to a question of the shade of grey—clear dark cinereous in *Berlepschi*, lined isabella in *albiventer*," although he continued to use both as names of species.

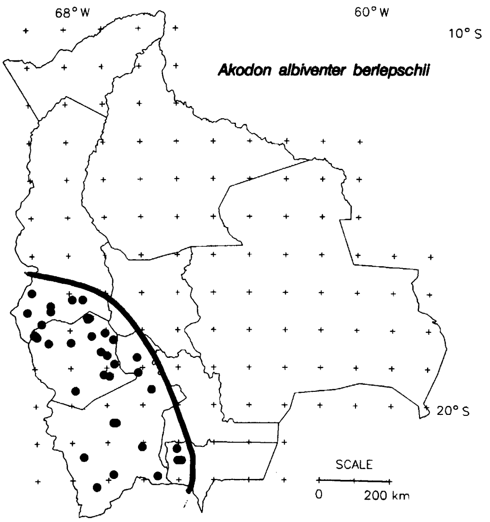


Fig. 708. Localities of known occurrence of *Akodon albiventer berlepschii.*

Pine et al. (1979: 347) provisionally recognized two subspecies, and perhaps the specimens from Tarija should be referred to *Akodon albiventer albiventer*. More specimens and more study of geographic variation are needed to resolve that question.

Morphological Characters and Comparisons: *Akodon albiventer* has grayish and slightly grizzled pelage above, with rather sharply demarked whitish below; ochraceous tints appear on sides and on tail. The white feet contrast noticeably with the color of the dorsum of body and tail. The bullae are relatively more inflated than in other *Akodon*.

Measurements in tables 18 and 20 are of specimens from 1 km W of Huancaroma (AM 260435–260446, MSB 55214–55217) and Lipez (BM 26.6.12.58, 59, 61, 65).

Distributional Notes: Widely distributed on the Altiplano and other highlands. Known localities are listed below and mapped in figure 708.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Parasitology: Specimens of the flea, *Neotyphloceras crassispina hemisus*, were reported from Potosí (Hopkins and Rothschild, 1966: 136). I have seen voucher specimens of the host. *Ectinorus* (*Ectinorus*) *pearsoni*, another flea, was reported from Potosí by Smit (1987: 109).

REPRODUCTION: Twenty-two females had data; 16 had no embryos, one had three embryos, and one had two embryos. Specimens were taken in August (14, including the two pregnant females), September (1), November (1), and December (2).

Scientific synonyms used for Bolivian specimens are:

Akodon albiventer berlepschii Thomas, 1898

Akodon Berlepschii Thomas, 1898a: 281 (type locality Esperanza, province of Pacajes, department of La Paz, Bolivia). Neveu-Lemaire and Grandidier, 1911: 13 (Esperanza).

Akodon albiventer: Thomas, 1902b: 226 (Challapata, Potosí, Uyuni). Neveu-Lemaire and Grandidier, 1911: 13 (Challapata, Uyuni). Hopkins and Rothschild, 1966: 136 (fleas from Potosí). Cabrera, 1961a: 453 (southern Bolivia). Myers et al., 1990: 103 (Finca St. Helena and Huancaroma). Steppan, 1995: 107 (MVZ 120233, 5 mi E of Uyuni).

Akodon Berlepschi: Thomas, 1902b: 226 (Pampa Aullaga). Neveu-Lemaire and Grandidier, 1911: 13 (Pampa Aullaga).

Bolomys albiventer: Thomas, 1926d: 195 (Lipez); 1926a: 323 (Sama).

Bolomys berlepschii: Tate, 1932f: 3. Gyldenstolpe, 1932: 118 (Esperanza).

Akodon (Bolomys) berlepschii: Sanborn, 1950: 13 (Estación Pérez, Esperanza, Mount Sahama region).

Akodon berlepschii: Cabrera, 1961a: 453.

Akodon albiventer berlepschii: Pine et al., 1979: 348 (first use of name combination). Anderson, 1985b: 12 (name in list). Anderson, 1993: 37 (general distributional records). Yensen and Tarifa, 1993: 55 (three localities near Sajama).

Akodon sp.: Yensen and Tarifa, 1993: 55 (three specimens from near Sajama probably are of the species *A. albiventer*.

LOCALITIES (45) AND SPECIMENS (191): **La Paz:** 1659/6902, 8.5 km W of San Andrés de Machaca, 11 AM, 9 CBF, 9 MSB; 1710/6738, Salla, 7 MNLP (2 not seen; Yoneda, 1984c); 1710/6755, Huaraco, 5 IE; 1720/6831, province of Pacajes, 1 CBF; 1727/6737, Huaraco-Antipampa, 1 from owl pellet (Peñaranda); 1729/6831, near Ullona, 0.5 km S of río Desaguadero, 2 CBF; 1730/6910, Estación Pérez, province of Pacajes, 1 FM, 2 MACN (not seen); 1749/6847, Esperanza, 1 BM, 1 FM; coordinates unknown, San José Llanguas, province of Aroma, 4 CBF. **Oruro:** 1739/6731, Huancaroma, near Eucaliptus, 1 UMMZ; 1740/6727, 3.5 km E of Huancaroma, 1 MSB; 1740/6730, 1 km W of Huancaroma, 12 AM, 4 MSB; 1742/6730, 12 km S and 1.6 km E of Eucaliptus, 2 AM; 1804/6702, 11 km N Machacamarca, 1 AM (244649); 1807/6900, Mount Sajama region, province of Carangas, 3 FM; 1808/6857, Quebrada Kahuiri, 3 CBF; 1808/6858, 1 km S of Sajama, 5 CBF; 1808/6859, 1.5 km SW of Sajama, 3 CBF; 1809/6724, 37 km SW of Oruro, 3.5 km NE of Toledo, 6 AM, 3 MSB; 1810/6855, 6 km NE of Lagunas, 1 AM; 1815/6648, 3 km NE of Huanuni, 3 AM; 1819/6759, 5 km W and 1 km N of Pomata Ayte, río Barros, 1 AM; 1820/6836, Estancia Agua Rica, 40 km E and 22 km S of Sajama, 3 AM; 1834/6709, 40 mi [= 65 km] S Oruro, 1 MVZ; 1840/6659, 10 km by road SW of Pazña, 10 UMMZ; 1854/6647, Challapata, 4 BM; 1908/6607, 7 km S and 4 km E of Cruce Ventilla, 1 AM; 1911/6705, Pampa Aullaga, 3 BM; 1913/6655, Santuario de Quillacas, province of Araroa, 1 IE; 1936/6753, Luca, province of Ladislao Cabrera, 1 IE. **Potosí:** 1844/6609, 3 km SE of Pocoata, 2 AM; 1935/6545, Potosí, 14 BM (including 4 unregistered); 2028/6645, 5 mi [= 8 km] E Uyuni, 2 MVZ; 2028/6646, 4 mi [= 6.4 km] E Uyuni, 1 MVZ; 2028/6650, Uyuni, 2 BM; 2107/6602, 40 km by road SE of Atocha, 1 AM; 2123/6741, 2 km N of Villa Alota, 3 EBD; 2151/6651, Lipez, 11 BM, 1 FM; 2154/6536, 5 mi [= 8 km] N of Villazon, 1 MVZ; 2211/6720, 10 km E of Cerro Quetena, 2 CBF; 2211/6720, río Quetena Chica, 3 EBD. **Tarija:** 2110/6503, 25 mi [= 40 km] SSE Camataqui, 1 MVZ; 2129/6455, 4.5 km E of Iscayachi, 3 AM, 2 MSB, 2 CBF; 2129/6502, Sama, 12 BM, 11 seen. **Department unknown:** coordinates unknown, "Hucucha," 1 São Paulo (Vanzolini, in litt.; however, since "hucucha" is the Quechua word for mouse, the use of the word here may not represent a locality designation).

Akodon azarae (Fischer), 1829

TAXONOMIC REMARKS: This name has its type locality outside of Bolivia. *M*[*us*]. ? *Azarae* was described by Fischer (1829:

325), type locality "In Paraguaya" or about 30°30′S latitude between the Uruguay and Paraná rivers, in Entre Ríos province, Argentina (Cabrera, 1961: 440). Tate (1932f: 5) used the name combination *Akodon azarae.*

Myers (1990: 18) mentioned Bolivia as the northern limit of the range of *Akodon azarae* but did not cite any Bolivian specimen or locality. Corbet and Hill (1991: 158) noted that *A. azarae* occurs in "Bolivia." Musser and Carleton (*in* Wilson and Reeder, 1993: 689) cited "southernmost Bolivia" but no specific record there. *Akodon sylvanus* Thomas (1921: 184) was treated as a subspecies of *Akodon azarae* by Cabrera (1961a: 441), but I am not aware that anyone has specifically identified any Bolivian specimen as an *Akodon azarae.* I suspect that the above references to Bolivian *azarae* are literary vestiges of Cabrera's assignment and of Thomas's original naming of a new taxon from Bolivia as *Akodon sylvanus pervalens.* Specimens of large *Akodon* from southeastern Bolivia need further study to clarify the status of *A. azarae, A. pervalens, A. sylvanus, A. simulator, A. tartareus, A. varius,* and perhaps other names.

Akodon boliviensis Meyen, 1833

Bolivian Grass Mouse,
Ratón Plomizo

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Akodon boliviense* was described by Meyen (1833: 600), type locality Pichu-Pichun, Chucuito Province, Puno Department, Peru. Thomas thought that Meyen's *A. boliviensis* probably could never be determined with certainty, as the type specimen is of a young animal, but later authors have been willing to use the name *A. boliviensis.* Myers et al. (1990: 49) argued that Meyen's mouse belongs to the *boliviensis*-group of *Akodon,* that only one species of the group has been found at the type locality, and that Meyen's illustration of the M3 shows a bilophodont form that is unusual in *Akodon. Akodon pacificus* was described on the basis of one specimen from La Paz and three other "not fully adult" specimens from Cochabamba department, and Thomas (1902a: 136) was "not quite satisfied about the determination of . . ." these. Myers et al. (1990: 59) noted that "specimens from Cochabamba Department assigned by Thomas to *pacificus* in the description of that species are probably *Akodon puer.*" These were from "Cochabamba" (presumably the city; BM 2.1.1.72 with occipitonasal length of 24.5 mm and maxillary tooth row length of 3.8) and two from Choro (BM 1902.1.1.73 and 74, taken on 4 May and 7 May 1901, although Thomas gave "8th to 10th May"). Corresponding measurements of BM 1902.1.1.73 were 24.0 mm and 3.7; BM 1902.1.1.73 had most of the back of the skull missing and I did not measure it. Tentatively I consider these three specimens to be young adults of *Akodon boliviensis.*

Akodon spegazzinii Thomas (1897a: 216, type locality lower Cachi River in Salta Province, Argentina) was regarded as a species separate from *A. boliviensis* by Myers et al. (1990: 60). They also recognized *Akodon spegazzinii tucumanensis* Allen (1901b: 410) from Tucumán as a subspecies. Both subspecies occur in northwestern Argentina. No Bolivian specimens have been referred recently to *A. spegazzinii.* Its occurrence in southern Bolivia remains to be verified.

I suspect that more than one species may eventually be discovered within *Akodon boliviensis* as presently recognized. Myers et al. (1990) recognized four species in the *boliviensis* group. Two of these species, *A. boliviensis* and *A. lutescens* (formerly *puer*), are sympatric over much of highland Bolivia. Variation with age in *A. boliviensis* was discussed and photographs of skulls of three ages by Myers et al. (1990: 32). Identification of individual specimens is not always an easy task, however, even when variation with age is taken into account. For example, I laid out 24 skulls from one place (1 km E of Iscayachi) and sorted them into three groups based on wear on the teeth. Within each of these "age" groups skulls were arranged by size. There was considerable variation in size within each group and no clear break into two size classes; occipitonasal lengths in the least-worn class ranged from 22.6 to 24.7 mm and in the most-worn class from 22.7 to 25.0 mm. The bilophodont posterior molar is not a useful character for identifying most of the skulls in this series, primarily because the teeth are too worn in most cases, but also because the relatively unworn tooth is not clearly bilophodont in a few cases. Later study probably will find misidentifications in my lists. I hope there will be few of these, but I am sure there will be some.

Akodon is not the only difficult group. Specimens have been studied in many different collections over a period of at least 15 years, and during this time taxonomic perceptions have changed. Let me be more optimistic and say that taxonomic knowledge has increased. In most cases, specimens have not been assembled in one place at one time for critical comparison. The point here is not to excuse my infelicities but to make my readers aware of the problems and to encourage reasonable skepticism. From awareness and questioning will come further progress.

Morphological Characters and Comparisons: In comparison with other akodontines from the Altiplano, *Akodon boliviensis* is generally larger than *Chroeomys andinus*, smaller than *C. jelskii*, and not much different in size from *A. albiventer*. *Akodon boliviensis* usually has darker pelage than *Chroeomys andinus* or *A. albiventer*, being dark grayish brown above, somewhat paler gray or sometimes buffy below. The feet are gray, sometimes with ochraceous or buff tinge, and do not contrast greatly with color of dorsum.

Voss (1991: 111) reported the presence of a gall bladder in two specimens from 2129/6457.

Measurements in tables 18 and 20 are of specimens from La Paz (BM 2.1.1.75, holotype of *A. pacificus*), río Aceramarca (AM 264800–264801; CBF 2322, 2324, 2326, 2327; MSB 68500), and 1 km E of Iscayachi, río Tomayapo (AM 262688–262691, 262696, 262698, 262711, 262713–262715, 262717, 262718, 262721).

Karyology: Barquez et al. (1980) reported a diploid chromosome number of 40 in a sample of *Akodon boliviensis tucumanensis* from northwestern Argentina.

Distributional Notes: Widely distributed in the Yungas and the highlands including the Altiplano, but no records are available from the most arid parts in Oruro and Potosí.

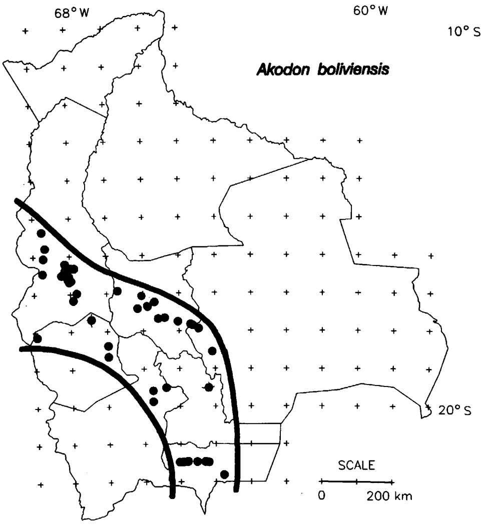


Fig. 709. Localities of known occurrence of *Akodon boliviensis*.

Known localities are listed below and mapped in figure 709.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Parasitology: Specimens of the flea, *Neotyphloceras crassispina hemisus*, were reported from Sucre (Hopkins and Rothschild, 1966: 136). I have not seen voucher specimens of the host, so the host identification is uncertain.

Reproduction: Twelve females were recorded with no embryos in January (2), March (1), May (1), June (3), August (1), September (2), and October (2). Eleven pregnant females were recorded in January (5), February (1), March (1), May (1), and September (3). Numbers of embryos were 3 (in 4 cases), 4 (1), 5 (3), 6 (2), and 7 (1); mean of 4.5.

Scientific synonyms used for Bolivian specimens are:

Akodon Spegazzinii: Thomas, 1902b: 226 (Lagunillas, Potosí). Neveu-Lemaire and Grandidier, 1911: 13 (Lagunillas, Potosí); not Thomas, 1897a: 216 (type locality Bajo río Cachi, province of Salta, Argentina).

Akodon pacificus Thomas, 1902a: 135 (type locality La Paz, department of La Paz, Bolivia). Neveu-Lemaire and Grandidier, 1911: 13 (Choro). Thomas, 1926b: 323 (Pino, Carlazo, Sama). Cabrera, 1961a: 446. Anderson, 1985b: 12

(name in list). Myers, 1990: 19 (mentioned the holotype). Corbet and Hill, 1991: 158 (name in list for "Bolivia").

Akodon caenosus: Thomas, 1925: 579 (Caraparí, BM 25.2.1.57 to 61).

Akodon (Akodon) pacificus: Tate, 1932f: 26 (name combination).

Akodon boliviensis spegazzinii: Cabrera, 1961a: 441 (name combination). Anderson, 1985*b*: 12 (name in list). Yensen and Tarifa, 1993: 55 (two localities near Sajama).

Akodon boliviensis: Hopkins and Rothschild, 1966: 136 (fleas from Sucre). Yoneda, 1984b: 12. Myers and Patton, 1989a: 27 (10 km by road SW of Pazña, UMMZ 156285). Myers et al., 1990: 101 (3 localities in La Paz, 4 in Oruro, 1 in Potosí, and 3 in Tarija). Mercado, 1990: 1 (Valle de La Paz). Salazar, 1990: 192 (two localities near Laguna Colorada). Mercado and Miralles, 1991: 295 (La Paz Valley). Voss, 1991: 111 (2129/6457). Mercado, 1991: 28 (Valle de La Paz). Anderson, 1993: 37 (general distributional records). Yensen et al., 1994: 407 (1808/6858, 1808/6859).

LOCALITIES (54) AND SPECIMENS (342): **Chuquisaca:** 1933/6408, Río Limón, 2 MSB. **Cochabamba:** 1656/6642, Choro, 2 BM, 16 MACN; 1704/6601, 4.4 km by road N of Tablas Monte, 2 AM, 1 CBF, 1 MSB; 1713/6554, 13 km N of Colomi, 3 AM, 1 CBF, 5 MSB; 1714/6541, Incachaca, 37 AM, 2 ANSP, 6 CM; 1714/6553, Poseidon, Laguna de Corani, 12.5 km N of Colomi, 1 AM, 1 CBF; 1721/6552, Colomi, 2 BM; 1724/6609, Cochabamba, 1 AM, 1 BM; 1730/6516, above Cocapata on road from Cochabamba to Santa Cruz , 1 CBF; 1739/6524, Pocona, 5 BM (including 2 unregistered); 1740/6535, 7.5 km SE of Rodeo, 5 MSB; 1745/6502, 17 km E of Totora, Tinkusiri, 3 AM, 3 MSB, 2 CBF; 1751/6437, 21 km by road W of Comarapa, 1 MSB. **La Paz:** 1521/6845, Ayata, 1 CBF; 1547/6840, Sorata, 3 IE; 1603/6843, Achacachi, province of Amasuyos, 1 US; 1612/6808, Lago Viscachani, 3 AM, 3 CBF, 3 MSB; 1619/6753, río Aceromarca, 3 AM, 5 CBF, 1 MSB; 1619/6758, Mina Lourdes, 1 AM; 1622/6808, Laguna Laram-kkota, 1 IE; 1625/6807, río Caluyo, 10 km NNE of La Paz, 6 MNLP; 1627/6845, Huacullani, 3 IE; 1630/6809, La Paz, Avenida del Poeta, 3 MNLP, 8 IE (2 not seen); 1630/6809, La Paz, 1 BM; 1630/6814, Khallutaha, 4 IE; 1632/6802, Orejuyo, 1 IE; 1633/6803, Los Pinos, 2 MNLP; 1633/6805, Cota Cota, 1 IE; 1637/6803, Huajchilla, 2 MNLP, 4 (Yoneda, 1984b: 12), 2 IE; 1639/6758, Collana, 13 MNLP, 1 UMMZ; 1640/6801, Mecapeca, 17 MNLP; 1640/6801, Valencia, 24 IE; 1641/6801, Mecapaca, 23 km SSE of La Paz, 2 MNLP; 1659/6749, Caracato, 1 AM; 1710/6755, Huaraco, 5 CBF; coordinates unknown, near Inquisivi, 1 CBF. **Oruro:** 1740/6730, 1 km W of Huancaroma, 1 MSB; 1808/6857, 1 km SE of Sajama pueblo, 1 CBF; 1808/6859, 1.5 km SW of village of Sajama, 1 CBF; 1823/6659, Poopó, 1 MNLP; 1840/6659, 10 km by road SW of Pazña, 2 UMMZ. **Potosí:** 1930/6523, Lagunillas, 1 BM; 1935/6545, Potosí, 3 BM; 1952/6545, 20 mi [= 32 km] S Potosí, 1 MVZ. **Santa Cruz:** 1749/6441, Serranía Siberia, 11 km by road NW of Torrecillas, 1 AM, 1 MNK; 1833/6405, Guadalupe, 10 km S Vallegrande, 1 US (not seen). **Tarija:** 2128/6418, Pino, 1 BM (26.1.1.76); 2128/6432, Carlazo, 1 BM (26.1.1.75); 2128/6448, Erquis, 1 AM; 2129/6412, 5 km NNW of Entre Ríos, 1 AM; 2129/6455, 4.5 km E of Iscayachi, 6 AM, 5 MSB, 5 CBF; 2129/6457, 1 km E of Iscayachi, río Tomayapo, 29 AM, 10 MNLP, 19 MSB; 2129/6502, Sama, 10 BM; 2149/6346, Caraparí, 5 BM (25.2.1.57 to 61).

Akodon dayi Osgood, 1916

A possible vernacular name is "Dark Lowland Grass Mouse," but the utility of such a name is questionable.

TAXONOMIC REMARKS: The association of *dayi* with *tapirapoanus* (see synonymy) is incorrect, because *dayi* is an *Akodon* and *tapirapoanus* is of the genus *Bolomys*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Myers (1990: 30) commented that "*A. dayi* can be distinguished immediately from all other members of the *varius* group by its dark feet and dark, unicolor tail. It further differs from *varius* by its short, dark pelage, more robust skull, and large size."

Measurements in tables 18 and 20 are of specimens from Ayacucho (AM 263289–263295, 263297–263306, in part).

DISTRIBUTIONAL NOTES: Distributed in lowland areas and up into the Yungas to at least 2450 m elevation (Ñequejahuira). Known localities are listed below and mapped in figure 710.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: Five pregnant females had 2, 2, 3, 3, and 5 embryos; mean 3.0. Pregnancies were recorded in March, June, and July. Nonpregnant females were recorded in June, July, and August. Two juveniles were recorded in March.

Scientific synonyms used for Bolivian specimens are:

Akodon dayi Osgood, 1916: 208 (type locality Todos Santos, río Chapare, department of Cochabamba, Bolivia). Gyldenstolpe, 1932: 102. Myers and Patton, 1989a: 27; 1989b: 24 (Rurrenabaque in Beni, Todos Santos in Cochabamba, 1 mi [= 1.6 km] W of Puerto Linares in La Paz, and seven localities in Santa Cruz). Myers, 1990: 29 and 37 (same localities cited by Myers and Patton earlier). Myers et al., 1990: 22 (photo of palate of skull, AM 262732 from Agua Dulce). Voss, 1991: 111 (presence of gall bladder in two specimens from 1724/6346). Patterson, 1992: 27 (Chulumani, El Consuelo, Victoria). Anderson, 1993: 37 (general distributional records). Anderson et al., 1993: 44 (vicinity of Santa Cruz de la Sierra).

Akodon (*Chalcomys*) *dayi*: Tate, 1932f: 24.

Akodon tapirapoanus dayi: Cabrera, 1961b: 447.

Akodon urichi dayi; Anderson, 1985: 12 (name in list).

Localities (41) and Specimens (257): **Beni:** 1420/6713, El Consuelo, 2 (Patterson, 1992: 27); 1428/6734, Rurrenabaque, 9 AM; 1450/6623, Beni Reserve, río Curiaba, 1 MNLP. **Cochabamba:** 1648/6508, Todos Santos, 26 AM, 1 BM, 21 FM, 1 MCZ; 1700/6550, Yungas, 1 AM; 1751/6440, 25 km by road W of Comarapa, 6 UMMZ. **La Paz:** 1333/6800, Ixiamas, Aserradero San Francisco, 8 CBF; 1401/6731, río Beni, 3 AM, 2 MSB; 1443/6830, Apolo, 1 MACN; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 8 MSU, 6 TTU; 1540/6735, 35 km by road N of Caranavi, 2 AM; 1608/6744, Chijchipani, 850 m elevation, 4 AM; 1619/6752, Ñequejahuira, 1 AM; 1624/6731, Chulumani, 1 São Paulo, 2 (Patterson, 1992: 27). **Pando:** 1056/6618, Remanso, 16 AM, 6 MSB; 1059/6610, Victoria, 2 (Patterson, 1992: 27); 1059/6619, left bank of río Madre de Dios, 5 AM, 3 MSB; 1101/6612, Agua Dulce, 6 AM, 3 MSB; 1102/6607, Las Piedras, 3 AM, 2 MSB; 1123/6712, Bella Vista, 2 AM, 1 MSB. **Santa Cruz:** 1543/6309, 6 km by road W of Ascención, 3 AM, 9 MSB; 1635/6412, Punta Rieles, 4 AM, 7 CENETROP; 1635/6225, San Ramón, Castedo, 5 MNK; 1636/6242, 10 km N of San Ramón, 3 AM, 1 MSB; 1637/6246, río Quiser, 3 CM (one with uncertain locality); 1700/6355, Ayacucho, 14 AM, 1 CENETROP, 1 MNK; 1713/6338, 6 km N of Buen Retiro, 4 AM; 1723/6314, 3 km SE Montero, 1 km N of Villa Copacabana, 2 AM, 3 MSB, 1 MNK; 1723/6332, San Miguel Rincón, 8 MSB; 1724/6346, 25 km by road W of Buenavista, W bank of río Yapacaní, 3 UMMZ (156305, 156306, 156245); 1727/6340, Buenavista, 1 BM, 5 MACN; 1730/6310, Warnes, 2 US; 1736/6336, San Rafael de Amboró, 3 AM (261922), 5 MSB; 1739/6245, 3.5 km W of Estación Pailón, 4 AM; 1741/6322, Terebinto, 1 MNK; 1743/6310, Km 9 N of Santa Cruz, 1 US; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 2 MSB; 1748/6310, Santa Cruz de la Sierra, 1 AM; 1751/6320, Ayacucho, 1 US; 1753/6307, Las Lomitas, 15 km S of Santa Cruz, 1 AM, 2 MNK; coordinates unknown, "Santa Cruz" only, 1 US.

Akodon fumeus Thomas, 1902

Smoky Grass Mouse, Ratón Fumoso

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Akodon mollis orophilus* was described by Osgood (1913: 98), type locality Leimabamba, upper Uteubamba, Amazonas, Peru. *Mus olivaceus* was described by Waterhouse (1837: 16), type locality Valparaiso, Chile. Bolivian assignments to these two species are misidentifications, in terms of the present taxonomy.

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from the department of Cochabamba (BM 34.9.2.152 and 153, 6 unregistered; BM 2.1.1.80, holotype of *A. fumeus*; AM 38585, 38591, 38594, 38612, 38613).

Distributional Notes: Distributed in or near the Yungas from 980 m elevation (near Cuyambuyo at the Argentine border) up to at least 3500 m (Choro, the type locality).

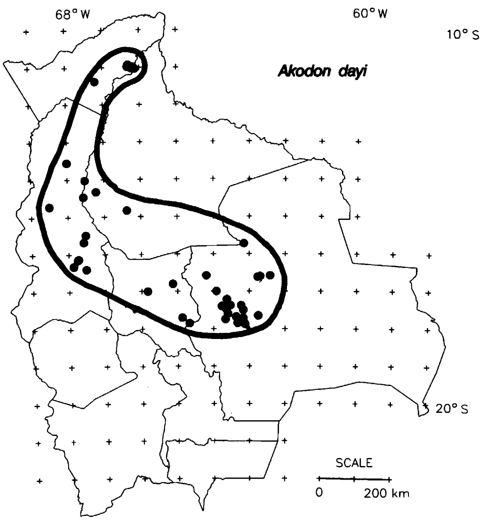


Fig. 710. Localities of known occurrence of *Akodon dayi*.

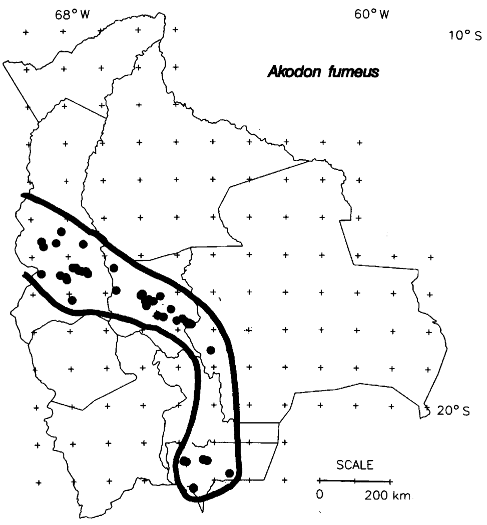


Fig. 711. Localities of known occurrence of *Akodon fumeus*.

Known localities are listed below and mapped in figure 711.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Data on 19 females include two with embryos (2 and 4, in November and October, respectively). Nonpregnant cases (17) were in June (5), July (11), and September (1).

Scientific synonyms used for Bolivian specimens are:

Acodon olivaceus: Thomas, 1898b: 3 (Caiza).

Akodon fumeus Thomas, 1902a: 137 (type locality Choro, department of Cochabamba, Bolivia). Neveu-Lemaire and Grandidier, 1911: 13 (Choro). Myers and Patton, 1989a: 27; 1989b: 24. Anderson, 1993: 37 (general distributional records).

Akodon (*Akodon*) *fumeus*: Tate, 1932f: 26.

Akodon mollis fumeus: Gyldenstolpe, 1932: 106 (first use of name combination). Cabrera, 1961a: 443 (Choro). Anderson, 1985b: 12 (name in list).

Akodon orophilus: Spotorno et al., 1990: 61 (20 km E of Totora).

LOCALITIES (50) AND SPECIMENS (253): **Chuquisaca:** coordinates unknown, Rosal, province of Tihumayu, 1 US. **Cochabamba:** 1620/6645, Yungas de Cochabamba, 1 BM, 1 CM, 2 MACN; 1656/6642, Choro, 2 BM, 10 FM; 1656/6642, Choro, province of Ayopaya, 3 AM; 1702/6559, 9.4 km by road N of Tablas Monte, 2 AM, 1 CBF; 1704/6601, 4.4 km by road N of Tablas Monte, 6 AM, 6 CBF, 5 MSB; 1706/6529, Yungas del Palmar, 8 BM (includes 6 unregistered), 2 FM; 1706/6529, Alto Palmar, province of Chapare, 2 AM; 1706/6529, Bajo Palmar, province of Chapare, 2 AM; 1706/6529, El Palmar, province of Chapare, 2 ANSP, 2 FM; 1711/6548, Locotal, 1 AM; 1713/6552, Corani, 7 AM, 4 CBF, 11 MSB; 1713/6554, 13 km N of Colomi, 5 AM, 4 CBF, 4 MSB; 1714/6541, Incachaca, 34 AM, 2 BM, 5 CM; 1714/6557, 16.5 km NW of Colomi, 4 AM, 3 CBF, 1 MSB; 1721/6552, Colomi, 3 BM (34.9.2.158 to 160), 2 MACN (not seen); 1739/6524, Pocona, 3 BM; 1742/6452, 20 mi. [= 32 km] E of Totora, 1 MVZ (119924); 1745/6502, 17 km E of Totora, Tinkusiri, 6 AM, 7 MSB, 5 CBF; 1748/6445, 101 km by road SE of Epizana, 3 AM; 1751/6440, 28 km by road W of Comarapa, 4 AM, 1 MSB; 1751/6442, 31 km by road W of Comarapa, 8 AM. **La Paz:** 1520/6810, Bellavista, 1 BM; 1535/6843, Tacacoma, 1 AM; 1538/6819, La Joya, 1 AM; 1540/6735, 35 km by road N of Caranavi, Serranía Bellavista, 2 AM; 1543/6840, 10 km by road N of Sorata, Moyabaya, río Challapampa, 1 UMMZ; 1618/6748, Chuspipata, 2 IE; 1618/6753, río Aceramarca, 6 AM; 1623/6743, Yanacachi, 1

AM, 1 BM (01.6.7.55); 1624/6731, Chulumani, 5 BM, 1 São Paulo (Vanzolini, in litt., 1982); 1624/6738, Tarila, 2 IE; 1627/6845, Huacullani (coordinates uncertain), 3 IE; 1628/6728, Irupana, 1 IE; 1630/6814, Khallutaka (near Laja), 4 IE; 1633/6805, La Paz, Cota Cota, 1 IE; 1637/6803, Huajchilla, 2 IE; 1710/6755, Huaraco, 2 IE; coordinates unknown, Lavi Grande, Campamento Qhana, 3 CBF. **Santa Cruz:** 1749/6441, Serranía Siberia, 11 km NW of Torrecillas, 1 MSB; 1751/6437, 21 km by road W of Comarapa, 1 AM; 1751/6440, 25 km by road W of Comarapa, 2 AM; 1833/6405, Guadalupe, 10 km S Vallegrande, 1 US (290926). **Tarija:** 2126/6355, Tapecua, 1 AM; 2127/6419, Rancho Tambo, 61 km by road E of Tarija, 4 AM, 5 MSB; 2128/6448, Erquis, 1 MSB; 2129/6412, 5 km NNW of Entre Ríos, 2 AM, 1 MSB; 2149/6334, Caiza, 1 BM (Thomas, 1898b); 2212/6436, 8 km by road N of Cuyambuyo, 1 UMMZ; 2213/6436, 4 km by road N of Cuyambuyo, 4 UMMZ. **Department unknown:** Bolivia only, 2 BM.

Akodon lutescens Allen, 1901

Puerile Grass Mouse,
Ratón Pueril

TAXONOMIC REMARKS: One of the names used for Bolivian specimens has its type locality outside of Bolivia; *Akodon lutesens* was described by Allen (1901a: 46), type locality "Tirapata, Puno, (alt. about 15,000 feet) [= 4500 m]"; spelling amended to *lutescens* on the same page. When *A. lutescens* was judged to be conspecific with *A. puer* instead of with *A. andinus* (Myers et al., 1990: 101), the authors did not notice that the oldest name was *lutescens* Allen, 1901, rather than *puer* Thomas, 1902. This oversight is corrected here. *Akodon puer caenosus* was described by Thomas (1918: 189), type locality "Leon, Jujuy, 1500 m." *Akodon puer* was said (by Barros et al., 1990, on the basis of specimens from Jujuy) to have a "close relationship" with *A. iniscatus* and the "varying 2n=40 akodont chromosome group."

Reig (*in* Vitullo et al., 1986: 73) studied specimens from Peru, Bolivia, and Argentina in the British Museum and considered *A. caenosus* Thomas, 1918, to be conspecific with *A. puer*. Myers et al. (1990: 102) recognized *Akodon puer caenosus* as a subspecies as did the author in the original description. Five specimens from Caraparí assigned by Thomas (1925: 579) to *A. caenosus* are reassigned here to *A. boliviensis*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: *Akodon puer* is a "small species of the olive-coloured group" (Thomas, 1902a: 136). Its description was based on three specimens from Choquecamate, 4000 m elevation.

Measurements of the type of *Akodon puer* were head and body, 78 mm; tail, 65; hind foot, 19 (s.u.); ear, 14.5; greatest length of skull, 24.2; basilar length, 18.8; zygomatic breadth, 11.7; length of nasals, 8.5; interorbital breadth, 4.5; breadth of braincase, 10.9; length of palate, 1.02; diastema, 6.1; palatal foramina, 5.4 by 1.9; and length of upper molar series, 3.4.

KARYOLOGY: Barquez et al. (1980) reported a diploid chromosome number of 34 in a sample of *Akodon caenosus* from northwestern Argentina. Bolivian data are not yet available.

DISTRIBUTIONAL NOTES: Distributed in or above the Yungas from 1130 m elevation (near Monteagudo) up to 4560 m (near Ulla Ulla). Not recorded from the more arid parts of the Altiplano. Known localities are listed below and mapped in figure 712.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: For *A. l. caenosus*, data on 12 females are available, including 11 with no embryos taken in July (9), August (2), and October (1), and one taken in July with two embryos. For *A. l. puer*, data on 21 females are available, including 20 taken in March (2), June (2), July (6), August (4), and September (6) with no embryos, and one with four embryos taken in March.

Scientific synonyms used for Bolivian specimens are given under subspecies below.

Akodon lutescens caenosus
Thomas, 1918

Akodon caenosus: Cabrera, 1962a: 442 (southern Bolivia). Corbet and Hill, 1991: 158 (name in list, from "S Bolivia").

Akodon puer caenosus: Myers et al. 1990: 102 (10

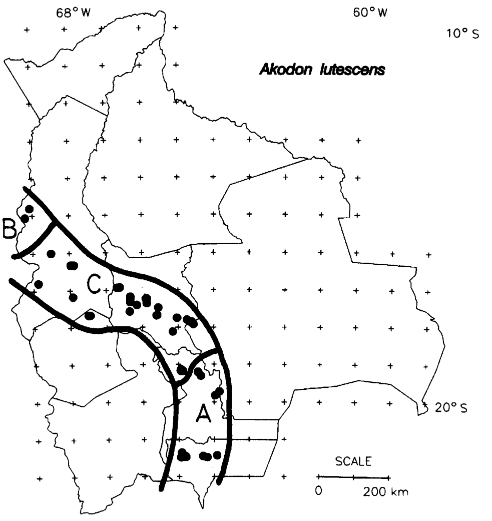


Fig. 712. Localities of known occurrence of three subspecies of *Akodon lutescens*, *A. l. caenosus* (A), *A. l. lutescens* (B), and *A. l. puer* (C).

km NW of Tarija and Rancho Tambo). Anderson, 1993: 37 (general distributional records).

LOCALITIES (13) AND SPECIMENS (213): **Chuquisaca:** 1912/6427, 11 km N and 16 km W of Padilla, 3 AM, 2 MNLP; 1918/6422, 9 km by road N of Padilla, 1 AM; 1943/6351, 2 km E of Chuhuayaco, 3 AM, 2 MNLP, 1 MSB; 1949/6358, 2 km SW of Monteagudo, 22 AM, 14 MNLP, 26 MSB. **Tarija:** 2121/6455, 10 mi [= 16 km] NW Tarija, 1 MVZ; 2126/6355, Tapecua, 2 AM, 1 MSB; 2127/6419, Rancho Tambo, 61 km by road E of Tarija, 2 AM; 2127/6449, 1 km E of Tucumilla, 10 AM, 14 CBF, 13 MSB; 2127/6452, Serranía Sama, 7 AM, 5 MSB; 2128/6448, Erquis, 21 AM, 15 CBF, 9 MSB; 2129/6412, 5 km NNW of Entre Ríos, 2 AM, 2 CBF, 1 MSB; 2129/6455, 4.5 km E of Iscayachi, 8 AM, 8 CBF, 7 MSB; 2129/6457, 1 km E of Iscayachi, río Tomayapo, 5 AM, 3 MNLP, 2 MSB.

Measurements in tables 18 and 20 are of specimens from 2 km SW of Monteagudo (AM 263633–263651), 1 km E of Iscayachi (AM 264219), and 4.5 km E of Iscayachi (AM 264213–264217).

Akodon lutescens lutescens
Allen, 1901

Akodon puer: Myers and Patton, 1989b:25 (in part, 7 km E of Ulla Ulla).

Akodon puer lutescens: Myers et al., 1990: 101 (7 km E of Ulla Ulla). Anderson, 1993: 37 (general distributional records).

LOCALITIES (2) AND SPECIMENS (4): **La Paz:** 1448/6904, Pelechuco, 2 CBF; 1503/6912, 7 km E of Ulla Ulla, 2 AM.

Measurements in tables 18 and 20 are of specimens from 1503/6912 (AM 247850–247851).

Akodon lutescens puer
Thomas, 1902

Akodon puer Thomas, 1902a: 136 (type locality "Choquecamate," department of Cochabamba, Bolivia, but not in the drainage basin of the río Sécure as stated by Cabrera, 1961a). Neveu-Lemaire and Grandidier, 1911: 13. Osgood, 1916: 208 (Parotani). Gyldenstolpe, 1932: 107. Anderson, 1985b: 12 (name in list). Reig, 1987: 384 (Choquecamate). Myers and Patton, 1989a: 28 (2 localities in Comarapa and 2 in Santa Cruz); 1989b: 25 (3 localities in Comarapa and 2 in Santa Cruz). Myers et al., 1990: 19 (photo of skull, AM 260452). Patterson, 1992: 27 (Liriuni, Toncoma, Ucho Ucho). Musser and Carleton *in* Wilson and Reeder, 1993: 692 (type locality). Anderson, 1993: 37 (general distributional records).

Akodon (Akodon) puer: Tate, 1932f: 26.

Akodon puer puer: Myers et al., 1990: 26 (palate figured, AM 260447), 27 (hind foot figured, AM 260451), 68 (photos of skull, AM 260404), 101 (11 localities in Cochabamba and 2 in Santa Cruz).

Akodon fumeus: Myers and Patton, 1989b: 24 (reidentification of AM 260495).

LOCALITIES (38) AND SPECIMENS (154): **Chuquisaca:** 1908/6456, 4 km N of Tarabuco, 1 AM; 1909/6456, 3 km N of Tarabuco, 1 MNLP, 2 MSB; 1910/6453, 2 km N and 3 km E of Tarabuco, 1 AM; 1910/6456, 2 km N of Tarabuco, 2 AM, 3 MNLP. **Cochabamba:** 1655/6637, Choquecamate, 3 BM; 1656/6642, Choro, province of Ayopaca, 8 FM; 1710/6620, Ucho Ucho, 1 Stockholm (Myers and Patton, 1989b); 1713/6552, Corani, 1 MSB; 1713/6554, 13 km N of Colomi, 2 AM, 2 CBF, 2 MSB; 1714/6553, Poseidon, Laguna de Corani, 12.5 km N of Colomi, 2 AM, 1 MSB; 1714/6557, 16.5 km NW of Colomi, 7 AM, 6 CBF, 5 MSB; 1715/6620, Toncoma, 2 Stockholm (Myers and Patton, 1989b); 1719/6620, Liriuni, 1 Stockholm (Myers and Patton, 1989b); 1721/6552, Colomi, 4 FM, 1 MACN; 1724/6609, Cochabamba, 2 CM; 1728/6533, 15 mi [= 24 km] ESE Tiraque, 1 MVZ; 1734/6621, Parotani, 3 FM; 1740/6535, 7.5 km SE of Rodeo, 2 MSB; 1740/6535, 9.5 km by road SE of Rodeo, then 2.5 km on road to ENTEL antenna, 11 AM; 1741/6536, 7.5 km SE of Rodeo, 3 AM, 3 CBF, 3 MSB; 1745/6502, 17 km E of Totora, Tinkusiri, 5 AM, 3 MSB; 1748/6445, 101 km by road SE of Epizana, Siberia Cloud Forest, 1 AM; 1751/6440, 28 km by road W of Comarapa, 2 AM; 1807/6509, Aiquile, 1 FM. **La Paz:** 1600/6830, Titicaca (coordinates uncertain), 13 from owl pellets in La Paz; 1619/6753, río Aceromarca, 1 AM, 1 CBF, 1 MSB; 1619/6758, Mina Lourdes, 1 AM, 1 CBF, 1 MSB; 1648/6852, 12 km by road SW of Jesús de Machaca, río Desaguadero, 1 AM; 1710/6755, Huaraco, 1 CBF. **Oruro:** 1740/6727, 3.5 km E of Huancaroma, 3 AM; 1740/6728, 2 km E of Huancaroma, 1 AM; 1740/6730, 1 km W of Huancaroma, 2 AM. **Santa Cruz:** 1730/6516, above Cocopata on old Cochabamba to Santa Cruz road, 3 CBF; 1738/6539, 25 km S of Arani on road to Mizque area, 1 CBF; 1751/6437, 21 km by road W of Comarapa, 11 AM, 6 MSB; 1751/6439, 3 km by road N of Torrecillas, 1 MNK, 1 MSB; 1755/6434, 1 km N and 8 km W of Comarapa, 4 AM, 1 MSB; coordinates unknown, Km 79 on Cochabamba to Oruro road, 1 CBF.

Measurements in tables 18 and 20 are of specimens from the type locality (BM 2.1.1.76 to 78) and from 21 km W of Comarapa (AM 260448–260450, 260452–260453, 260404).

Akodon mimus (Thomas), 1901

Soft Grass-Mouse, Raton Mimoso

TAXONOMIC REMARKS: An elongated muzzle has been developed several times in the evolution of akodont rodents, reaching its most extreme condition in *Oxymycterus*. *Oxymycterus mimus* was described by Thomas (1901a: 183), type locality Limbane, department of Puno, Peru. The genus *Microxus* was proposed by Thomas (1909: 237); the first use of the name combination *Microxus mimus*. Cabrera (1961a: 458) used the name *Akodon* (*Microxus*) *mimus*. Cladistic analyses based on biochemical data place *mimus* well within the group of species composing the genus *Akodon*, not as a separate branch, and led to dropping the use of *Microxus* as either genus or subgenus (Patton et al., 1989; Smith and Patton, 1991, 1993).

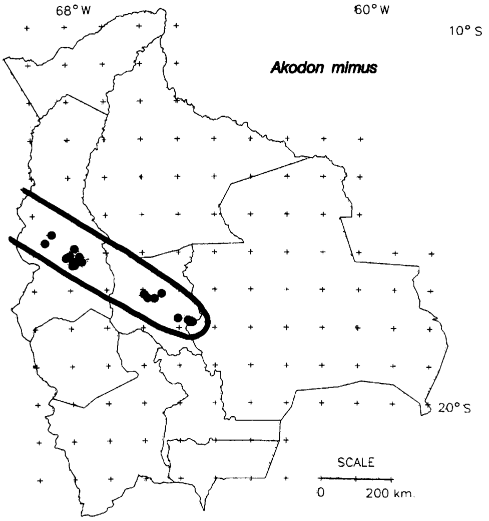


Fig. 713. Localities of known occurrence of *Akodon mimus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from 1751/6440 (UM 155963–155976) and 28 km W of Comarapa (AM 260591, 260595, 260596, 260600–260601).

DISTRIBUTIONAL NOTES: Distributed, generally in the more humid parts of the Yungas, from 2000 m elevation (in the Zongo Valley) up to at least 3690 m (in the Unduavi valley at Pongo). Known localities are listed below and mapped in figure 713.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Data on 44 females, including 38 not pregnant in May (1), June (25), June (1), and September (11). Five were pregnant, all in October, with 1, 2, 2, 2, and 3 embryos; mean 2.0. One female in June was lactating.

Scientific synonyms used for Bolivian specimens are:

Microxus mimus: Anderson, 1985b: 13 (name in list). Myers and Patton, 1989a: 28; 1989b: 25. Myers et al., 1990: 104 (13 localities in Cochabamba, La Paz, and Santa Cruz).

Akodon (Abrothrix) mimus: Sanborn, 1950: 15 (río Aceramarca, Cocapunco, Pongo).

Akodon mimus: Cabrera, 1961a: 458. Smith and Patton, 1991: 101. Anderson, 1993: 37 (general distributional records).

Akodon (Microxus) mimus: Steppan, 1995: 110 (AM 260429, 260586, 260587, 260592, 260593, 260595–260599, from 1751/6440).

LOCALITIES (28) AND SPECIMENS (533): **Cochabamba:** 1706/6529, Yungas del Palmar, 8 BM; 1707/6558, on road between Tablas Monte and main road, 1 AM; 1708/6557, 15 km by road SE of Tablas Monte, 1 MSB; 1713/6552, Corani, 28 AM, 19 CBF, 18 MSB; 1714/6541, Incachaca, 1 ANSP; 1745/6502, 17 km E of Totora, Tinkusiri, 5 AM, 3 CBF; 1748/6445, 101 km by road SE of Epizana, Siberia Cloud Forest, 20 AM; 1751/6440, 28 km by road W of Comarapa, 21 AM, 1 CBF, 12 MSB; 1751/6440, 25 km by road W of Comarapa, 39 UMMZ; 1751/6442, 31 km by road W of Comarapa, 7 AM. **La Paz:** 1530/6829, Cocapunco, 15 AM; 1543/6840, 10 km by road N of Sorata, Moyabaya, 7 UMMZ; 1553/6752, 30 km by road N of Zongo, 22 UMMZ; 1604/6800, 18 km by road N of Zongo, 21 UMMZ; 1607/6805, 0.5 km E of Saynani, 4 AM, 5 CBF, 3 MSB; 1608/6806, Saynani, 9 AM, 7 CBF, 10 MSB; 1611/6754, 4 km E of Cotapata, 3 AM; 1613/6754, Santa Barbara, Cotapata, 8 AM; 1615/6750, 15 km by road NE of Unduavi, 29 UMMZ; 1617/6751, río Unduavi, 18 AM, 11 CBF, 10 MSB; 1618/6748, 31 km by road S of río Coroica crossing, 4 UMMZ; 1618/6753, río Aceramarca, 30 AM; 1618/6753, río Aceramarca, 1 km S of Yerbani, 10 UMMZ; 1619/6753, río Aceromarca, 30 AM, 23 CBF, 21 MSB; 1619/6752, Ñequejahuira, 22 AM; 1619/6753, río Aceramarca, 1 CBF; 1620/6752, Pongo, 8 AM, 2 FM. **Santa Cruz:** 1749/6441, Serranía Siberia, 11 km by road NW of Torrecillas, 8 AM, 3 CBF, 5 MSB.

Akodon pervalens Thomas, 1925

TAXONOMIC REMARKS: The relationships of *sylvanus*, *pervalens*, *tartareus*, *varius*, and *azarae* need further consideration. Myers (1990: 19) recognized *Akodon pervalens* as a species separate from species of the *varius* group. Cabrera (1961a: 441) first used the name combination *Akodon azarae sylvanus*. Musser and Carleton (*in* Wilson and Reeder, 1993: 693) left *pervalens* in *Akodon sylvanus*, presumably as a subspecies, as did the original author, Thomas. The single specimen from Pino reported by Thomas (1926b: 322) was said to agree closely with the typical series of *Akodon sylvanus* from the Sierra Santa Barbara, Jujuy, Argentina, in being smaller than *A. s. pervalens* from Caraparí in Tarija. Comparisons with *tartareus* (now *A. simulator tartareus*) were also mentioned and *sylvanus* was said to have a well-marked anterior groove on M1 that was not present in *tartareus*. The seven specimens listed below need restudy to test whether they are all of one species and whether the correct name for that species is *Akodon sylvanus*. At present, these taxonomic hypotheses are not firmly established.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: The holotype (BM 25.2.1.55) was said to have "a broad, heavy rostrum, large, globular bullae, smoothly rounded interorbital region," and the pelage to be "a dark grayish or brownish olive" dorsally. No eye ring was noted. The venter was said to have hairs with dark bases and buffy tips, the chin and throat to lack any trace of white, and the tail not to be bicolored Thus, "*Akodon pervalens* appears to be phenetically more similar to *Akodon cursor* than to either *varius* or *sylvanus*" (Myers, 1990: 19).

Measurements in tables 18 and 20 are of the holotype.

DISTRIBUTIONAL NOTES: Ranges from 900 m elevation (near Cuyambuyo) up to at least 2100 m (Tola Orko) in Tarija and Chuquisaca. Known localities are listed below and mapped in figure 714.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Akodon sylvanus pervalens Thomas, 1925: 579 (type locality "Carapari, 1000 m.", department of Tarija, Bolivia). Gyldenstolpe, 1932: 104. Musser and Carleton *in* Wilson and Reeder, 1993: 693 (considered *pervalens* to be conspecific with *sylvanus*).

Akodon varius: Thomas, 1925: 579 (Caraparí, BM 25.2.1.55 and 56).

Akodon sylvanus: Thomas, 1926b: 322 (Pino).

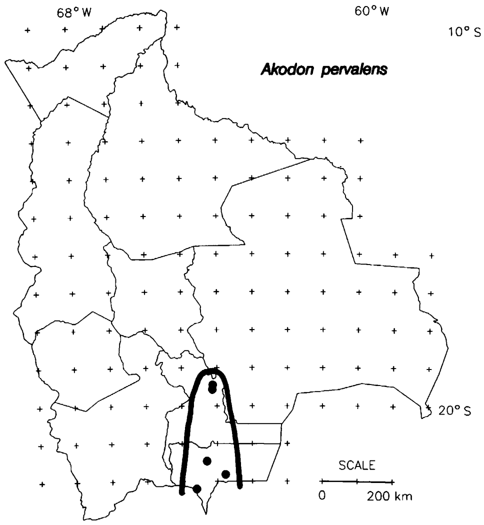


Fig. 714. Localities of known occurrence of *Akodon pervalens.*

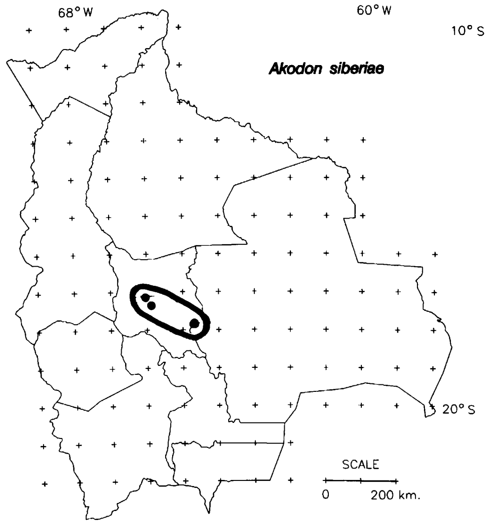


Fig. 715. Localities of known occurrence of *Akodon siberiae.*

Akodon azarae sylvanus: Cabrera, 1961a: 441 (first use of this name combination). Anderson, 1985b: 12 (name in list).

Akodon pervalens: Anderson, 1985b: 12 (name in list). Myers, 1990: 19 (Caraparí). Anderson, 1993: 37 (general distributional records).

LOCALITIES (6) AND SPECIMENS (10): **Chuquisaca:** 1927/6407, Tola Orko, 40 km from Padilla, 2 US; 1934/6408, Tihumayu, 1 US. **Tarija:** 2128/6418, Pino, 1 BM (26.1.1.74); 2149/6346, Caraparí, 2 BM (25.2.1.55 and 56); 2212/6436, 8 km by road N of Cuyambuyo, 1 UMMZ; 2216/6433, 3 km SE of Cuyambuyo, 1 AM, 1 CBF, 1 MSB.

Akodon siberiae Myers and Patton, 1989a

Vernacular names are Siberia Grass Mouse or Ratón de Siberia. The names are potentially misleading if standing alone because most people are more familiar with Siberia in Asia.

TAXONOMIC REMARKS: Morphologically, *A. siberiae* is similar to *A. budini* of Argentina, the type species of *Hypsimys* (Myers and Patton, 1989a: 24). If *Hypsimys* is recognized as a subgenus or genus, then *A. siberiae* might be placed therein. Musser and Carleton (*in* Wilson and Reeder, 1993: 692) recognized the subgenus *Hypsimys.*

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from the vicinity of the Siberia cloud forest, 28 km W of Comarapa (AM 260426–260434, MSB 55209–55213), 31 km W of Comarapa (AM 260423—260425, 260578–260579, 260590, 260594).

KARYOLOGY: The diploid chromosome number is 38. The "fundamental number" of chromosomal arms is 40 (Myers and Patton, 1989a: 20).

DISTRIBUTIONAL NOTES: Distributed from elevation 1833 m (4.4 km N of Tablas Montes) to 3075 m (Colomi). Known localities listed below and mapped in figure 715.

HABITAT: Cloud forest.

No data are available on habits, behavior, or food.

REPRODUCTION: Four females with no embryos were taken in September. No other data are available.

Scientific synonyms used for Bolivian specimens are:

Akodon siberiae Myers and Patton, 1989a: 4 (type locality "28 km by road W of Comarapa, Cochabamba Dept., Bolivia, elevation 2800 m, 17°51′S, 64°40′W." Anderson, 1993: 37 (general distributional records). Lawrence, 1993: 117 (type locality). Smith and Patton, 1993: 156 (1751/6440).

Akodon sp.: Myers and Patton, 1989b: 25.

Akodon (*Hypsimys*) *siberiae*: Musser and Carleton *in* Wilson and Reeder, 1993: 692 (use of subgenus).

Localities (6) and Specimens (35): **Cochabamba:** 1704/6601, 4.4 km N of Tablas Montes, 7 MSB; 1708/6557, 15 km by road SE of Tablas Montes, 1 MSB; 1721/6552, Colomi, 4 MACN; 1751/6440, 28 km by road W of Comarapa, 11 AM, 5 MSB; 1751/6442, 31 km by road W of Comarapa, 2 AM. **Santa Cruz:** 1749/6441, Serranía Siberia, 11 km NW by road of Torrecillas, 3 AM, 2 MNK.

Akodon simulator Thomas, 1916f

Akodon simulator tartareus Thomas, 1919

Gray-bellied Grass Mouse, Raton Variado

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Akodon tartareus* was described by Thomas (1919d: 155), type locality Tartagal, Salta, Argentina. Specimens from 3 km SE of Cuyambuyo formerly assigned (Anderson, 1993: 37) to *A. sylvanus* (of Thomas, 1921c: 184; type locality "Sunchal," Sierra de Santa Barbara, province of Jujuy, Argentina, at elevation 1200 m) are assigned now to *A. simulator tartareus*. This leaves no Bolivian specimens of *A. sylvanus*, unless *A. pervalens* is a subspecies of *A. sylvanus*, as currently treated by Musser and Carleton (*in* Wilson and Reeder, 1993: 693).

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from 2128/6429 (UM 155860 and 156324), 2136/6445 (MVZ 119944 and 119946), Tablada (BM 26.1.1.47, 26.1.1.50 to 54), and Carlazo (BM 26.1.1.56, 59, 60, 62, 63, 66, and 68).

Karyology: Barquez et al. (1980) reported a diploid chromosome number of 41 or 42 in a sample of *Akodon varius simulator* from northwestern Argentina. Bolivian data are not yet available.

Distributional Notes: Ranges from elevation 650 m (Camatindy) to 2400 m (Carlazo). Known localities are listed below and mapped in figure 716.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: Two females were recorded in August with no embryos.

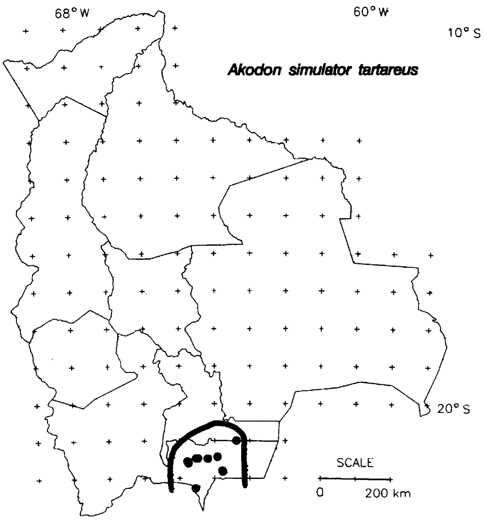


Fig. 716. Localities of known occurrence of *Akodon simulator tartareus*.

Scientific synonyms used for Bolivian specimens are:

Akodon tartareus: Thomas, 1926b: 322 (Carlazo, Tablada).

Akodon varius tartareus: Anderson, 1985b: 13 (name in list).

Akodon simulator tartareus: Myers, 1990: 38 (Caraparí, BM 25.2.1.53 and 54; 8 km by road N of Cuyambo; and Carlazo). Anderson, 1993: 37 (general distributional records).

Akodon simulator: Corbet and Hill, 1991: 158 (name in list, from "Bolivia").

Akodon sylvanus: Anderson, 1993: 37 (one locality, Tarija).

Localities (10) and Specimens (122): **Tarija:** 2100/6323, 1 km S of Camatindi, 3 AM, 1 CBF, 1 MSB; 2126/6355, Tapecua, 9 AM, 4 CBF, 7 MSB; 2128/6429, 38 km by road ENE of Tarija, Carlazo, 4 UMMZ; 2128/6432, Carlazo, 23 BM, 2 FM; 2129/6412, 5 km NNW of Entre Rios, 10 AM, 6 CBF, 6 MSB; 2133/6447, Tablada, 8 BM (26.1.1.47 to 54); 2136/6445, 5 mi [= 8 km] S Tarija, 2 MVZ; 2148/6347, 3 km WNW of Caraparí, 3 CBF, 4 MSB; 2149/6346, Caraparí, 2 BM (25.2.1.53 and 54); 2216/6433, 3 km SE of Cuyambuyo, 10 AM, 8 CBF, 9 MSB.

Akodon subfuscus Osgood, 1944

Taxonomic Remarks: The name used for Bolivian specimens has its type locality out-

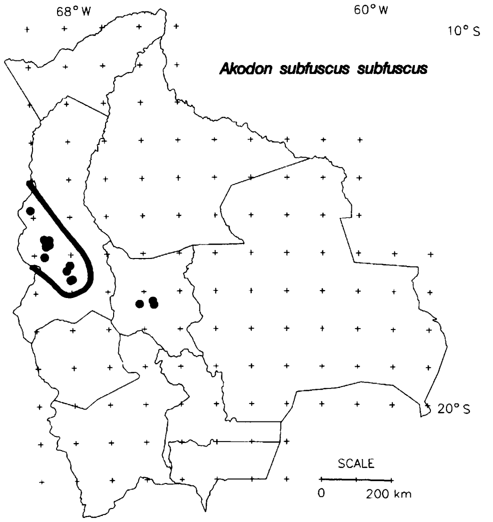


Fig. 717. Localities of known occurrence of *Akodon subfuscus subfuscus*. Records in Cochabamba need verification.

side of Bolivia. *Akodon boliviensis subfuscus* was described by Osgood (1944: 195), type locality "Limbani, [department of] Puno, Inambari drainage, Peru."

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from Sorata (AM 91560–91572, in part).

Distributional Notes: Ranges from elevation 2000 m (Ayañe) to 4465 m (near Ulla Ulla) in La Paz. Known localities are listed below and mapped in figure 717. Specimens from Cochabamba need to be restudied.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Akodon subfuscus subfuscus Osgood, 1944

Akodon boliviensis subfuscus: Sanborn, 1950: 12 (Yungas del Palmar, río Aceramarca, Alaska Mine). Cabrera, 1961a: 441. Anderson, 1985b: 12 (name in list).

Akodon boliviensis: Yoneda, 1984b: 12; 1984c (Huajchilla).

Akodon subfuscus: Myers and Patton, 1989a: 28 (four localities in La Paz); 1989b: 25 (four localities in La Paz). Patterson, 1992: 26 (Chilcani, Cuesta Cucho, Huancuni, Illataco, Sorata; the identifications of those from Cuesta Cucho and Illataco need verification). Anderson, 1993: 37 (general distributional records).

Akodon subfuscus subfuscus: Myers et al., 1990: 101 (seven localities in La Paz Department).

Akodon subfucus: Corbet and Hill, 1991: 158 (variant spelling, name in list).

Identifications of the specimens listed below from Cochabamba need to be reconsidered in view of the restriction of *A. subfuscus* to La Paz department by Myers et al. (1990).

Localities (16) and Specimens (75): **Cochabamba:** 1715/6545, Cuesta Cucho 1 (Patterson, 1992: 26); 1720/6607, Illataco, 1 (Patterson, 1992: 26); 1721/6543, Cuchacancha, 1 AM [skin with dubious skull]. **La Paz:** 1448/6904, Pelechuco, 1 IE; 1535/6843, Tacacoma, 3 AM; 1535/6843, Tacacoma-Sorata, 2 AM; 1536/6835, Ayañe, 1 BM (01.1.1.81); 1544/6835, Huancuni, 12 Stockholm (Myers and Patton, 1989b); 1544/6840, Chilcani, Mt. Illampu, 3 Stockholm (Myers and Patton, 1989b); 1547/6840, Sorata, Mt. Illampu, 14 Stockholm (Myers and Patton, 1989b); 1547/6840, Sorata, base of Mt. Sorata, 13 AM, 2 BM; 1603/6843, Achacachi, province of Omasuyos, Hacienda Pocoata, 1 US; 1617/6802, Alaska Mine, 4 AM; 1625/6807, río Caluyo, 10 km NNE of La Paz, 6 MNLP, 7 (Yoneda, 1984); 1639/6758, Collana, 1 UMMZ; 1640/6801, Mecapeca, 2 MNLP.

Akodon toba Thomas, 1921

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Akodon toba* was described by Thomas (1921b: 178), type locality "Jesematathla, northern Chaco. Alt. 100 m." in Paraguay.

Morphological Characters and Comparisons: Myers, 1990: 28, commented that "*A. toba* differs from *varius*, *simulator*, and *dayi* in its relatively short, broad skull. . ..It always lacks the white throat that is typical of some members of the group, and the finely ticked, gray dorsal pelage of *toba* is also very distinctive."

Measurements in tables 18 and 20 are of specimens from 2119/6325 (AM 246695, 246699–246700, 246703–246705, 264707, 246733, 246735, 246741–246743, 246755).

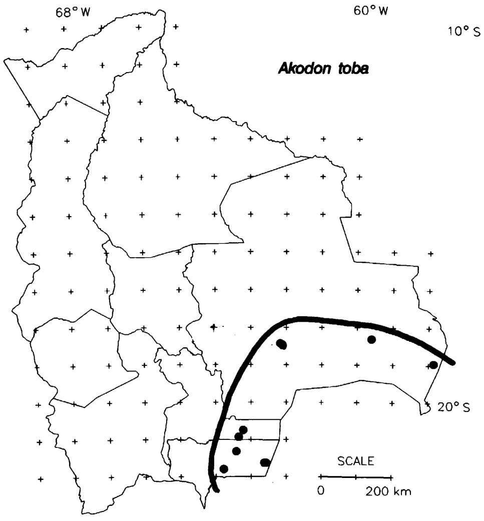


Fig. 718. Localities of known occurrence of *Akodon toba*.

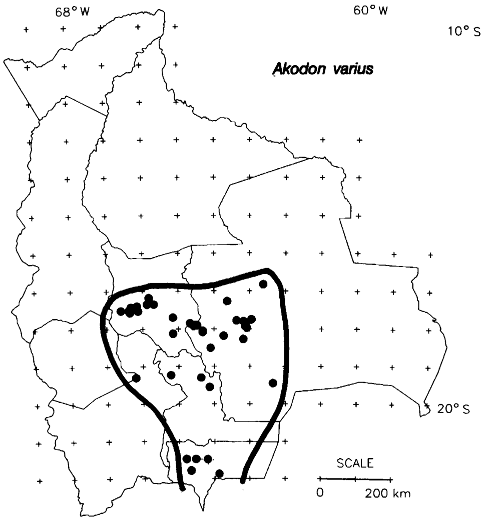


Fig. 719. Localities of known occurrence of *Akodon varius*.

DISTRIBUTIONAL NOTES: Distributed at lower elevations in the Chaco, up to about 1000 m (Caraparí). Known localities listed below and mapped in figure 718.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Females with no embryos were recorded in August (6) and in October (1). No other data are available.

Scientific synonyms used for Bolivian specimens are:

Akodon toba: Myers, 1990: 27 (two localities in Chuquisaca, Tita in Santa Cruz, and 8 km S and 10 km E of Villa Montes in Tarija; photographs of dentitions on p. 51). Anderson, 1993: 37 (general distributional records).

Akodon varius toba: Anderson, 1985b: 13 (name in list).

Akodon varius: Olds and Anderson, 1990: 67, 72 (photographs of skull from Tita).

LOCALITIES (10) AND SPECIMENS (91): **Chuquisaca:** 2045/6313, Porvenir, 1 AM, 1 MSB; 2056/6321, 2 km S and 10 km E of Tiquipa, Laguna Palmar, 1 AM. **Santa Cruz:** 1818/5936, 4 km N and 1 km W of Santiago de Chiquitos, 2 AM; 1825/6210, Tita, 2 AM, 1 MNLP, 1 MSB; 1828/6207, 8 km SE of Tita, 1 AM (260532); 1857/5751, Puerto Suárez, 2 CM. **Tarija:** 2119/6325, 8 km S and 10 km E of Villa Montes, 35 AM, 1 MNLP; 2138/6234, Estancia Bolivar, 15 AM, 8 CBF, 6 MSB; 2138/6237, 5 km W of Estancia Bolivar, 3 AM, 5 CBF, 5 MSB; 2148/6347, 3 km WNW of Caraparí, 1 AM.

Akodon varius Thomas, 1902

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from Vinto (AM 38625–38633) and Parotani (AM 38665—38676, in part).

DISTRIBUTIONAL NOTES: Ranges from elevation 365 m (27 km SE of Santa Cruz) up to at least 3200 m (Serranía Sama). Known localities are listed below and mapped in figure 719.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Data on 21 females, none with embryos, taken in May (1), July (14), August (4), and September (2).

Scientific synonyms used for Bolivian specimens are:

Akodon varius Thomas, 1902a: 134 (type locality Cochabamba, department of Cochabamba, Bolivia, and Tapacari). Neveu-Lemaire and Grandidier, 1911: 12 (Cochabamba, Paratani, Tapacari). Osgood, 1916: 208 (Parotani). Reig, 1987: 355 (Cochabamba). Myers and Patton, 1989a: 28 (one locality in Chuquisaca, five in Cochabamba, one in Comarapa, and one in Tarija). Myers, 1990: 29 (40 specimens from Pulce in Chuquisaca, five localities in Cochabamba, three in Santa Cruz, and Carlazo in Tarija).

Akodon (*Akodon*) *varius varius*: Tate, 1932f: 26 (name combination).

Akodon varius varius: Gyldenstolpe, 1932: 102. Anderson, 1985: 13 (name in list). Anderson, 1993: 37 (general distributional records). Anderson et al., 1993: 44 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (42) AND SPECIMENS (345): **Chuquisaca:** 1914/6513, Pulce, 1 AM; 1918/6422, 9 km by road N of Padilla, 1 MSB; 1933/6408, río Limón, 30 AM, 26 MNLP, 38 MSB. **Cochabamba:** 1711/6549, Chapare, 1 BM; 1721/6541, Cuchacancha, 4 AM; 1721/6552, Colomi, 1 FM; 1724/6609, Cochabamba, 1 AM, 2 BM, 6 FM, 1 MACN; 1726/6619, Vinto, 12 AM; 1731/6623, 15 mi [= 24 km] E of Tapacari, 1 MVZ; 1731/6636, Tapacari, W of Cochabamba, 3 BM; 1732/6607, 1.3 km W of Jamachuma, 8 AM, 5 CBF, 5 MSB; 1734/6621, Paratani, 16 AM, 1 BM, 1 FM; 1742/6509, Totora, 1 BM; 1747/6322, 2 km SW of Estancia Las Cruces, 1 MSB; 1807/6509, Aquile, 2 FM. **Potosí:** 1918/6612, río Cachimayo, 4 AM. **Santa Cruz:** 1649/6237, Palmarito, río San Julian, 6 CM; 1716/6338, 3 km N of Buen Retiro, 1 MSB; 1745/6257, Cotoca, 8 from owl pellets in collection in La Paz; 1747/6322, 2 km SW of Las Cruces, 1 AM; 1748/6310, Santa Cruz, 3 from owl pellets in collection in La Paz; 1751/6440, 25 km by road W of Comarapa, 6 UMMZ; 1753/6307, 15 km S of Santa Cruz, 22 MSB; 1754/6429, Comarapa, 9 BM; 1754/6432, 8.5 km by road W of Comarapa, 1 MSB; 1754/6434, 5 mi [= 8 km] W Comarapa, 1 MVZ; 1755/6308, 15 km S of Santa Cruz, 17 MSB, 1 Hayward coll.; 1755/6434, 1 km N and 8 km W of Comarapa, 2 MSB; 1758/6305, 27 km SE of Santa Cruz, 4 MSB; 1805/6419, 3 km NE of Quiñe, 1 AM; 1811/6344, 1 km NE Estancia Cuevas, 1 MSB; 1816/6311, 3 km N of Zanja Honda, Hacienda El Pelícano, 2 MNK; 1803/6419, 5 km NE of Quiñe, 1 AM; 1830/6406, Vallegrande, 2 US; 1927/6221, Cerro Colorado, 9 EBD. **Tarija:** 2127/6449, 1 km E of Tucumilla, 1 MSB; 2127/6452, Serranía Sama, 1 MSB; 2128/6432, Carlazo, 2 FM, 4 UMMZ; 2128/6448, Erquis, 9 AM; 2129/6412, 5 km NNW of Entre Ríos, 5 MSB; 2147/6440, 11.5 km N and 5.5 km E of Padcaya, 22 AM, 12 CBF, 17 MSB; 2148/6346, 3 km WNW of Carapari, 2 MSB.

Akodon, species not determined

LOCALITIES (39) AND SPECIMENS (124): **Chuquisaca:** 1929/6433, Horcus, 80 km SE of Sucre, 3 MVZ; 1949/6358, 2 km SW of Monteagudo, 3 AM, 3 MNLP, 3 MSB. **Cochabamba:** 1630/6635, Ayopaya, 18 MACN (not seen); 1714/6514, Incachaca, 3 ANSP; 1721/6543, Cuchicancha, 5 AM; 1724/6609, Cochabamba (coordinates of the city), 1 MACN (not seen); 1740/6535, 7.5 km SE of Rodeo, 4 MSB; 1742/6509, Totora, 1 BM (unregistered); 1751/6440, 28 km by road W of Comarapa, 2 AM; 1807/6509, Aiquile, 1 FM; coordinates unknown, Chapare, 3 MACN (not seen). **La Paz:** 1515/6810, Mapiri, 5 AM; 1521/6845, Ayata, 1 MNLP (not seen); 1527/6728, Puerto Linares, 1 MNLP; 1528/6818, Ticunhuaya, 1 AM; 1547/6840, río Sorata, 1 AM; 1622/6807, Laguna Kellguani, 3 MNLP; 1624/6738, Tarila, Nor Yungas, 2 IE; 1630/6809, La Paz, Avenida de la Poeta, 1 MNLP. **Oruro:** 1804/6702, 11 km N of Machacamarca, 1 AM; 1809/6724, 37 km SW of Oruro, 3.5 km NE of Toledo, 3 MSB; 1854/6647, Challapata, 1 BM (not seen). **Potosí:** 2145/6723, 10 km E of Cerro Quetena, 2 MNLP; 2210/6742, 2 km E of ENDE camp, Laguna Colorado, 1 MSB; 2218/6744, 21 km by road SE of ENDE camp, Laguna Colorado,1 MSB. **Santa Cruz:** 1716/6338, 3 km N of Buen Retiro, 1 MSB; 1727/6340, Buena Vista, 10 MACN (not seen); 1740/6327, Wendá Patriota, Andrés Ibáñez province, 1 MNK; 1745/6257, Cotoca, 1 AM; 1758/6305, 27 km SE of Santa Cruz, 3 MSB; 1809/6352, Samaipata, 1 MACN (not seen); 1827/6406, Guadalupe, 1 US; 1948/6331, Cerro Itahuaticua, 1 MSB; coordinates unknown, Floripondio, 1 MACN (not seen); coordinates unknown, La Forestal, Andrés Ibáñez province, 1 MNK. **Tarija:** 2129/6455, 4.5 km E of Iscayachi, 1 AM; 2129/6457, 1 km E of Iscayachi, río Tomayapo, 21 MSB; 2132/6412, Entre Ríos, province Oconnor, 1 US (young in alcohol, skull removed); 2213/6436, 4 km by road N of Cuyambuyo, 4 UMMZ. **Department unknown:** Bolivia only, 2 BM.

Genus *Bolomys* Thomas, 1916

The type species of the genus or subgenus *Bolomys* Thomas, 1916g, is *Akodon amoenus* Thomas, 1900e: 468, with type locality at "Calalla, Rio Colca, near Sumbay, Peru. Altitude 3500 metres." The rather involved taxonomic history of *Bolomys* was reviewed and a revised diagnosis for the genus was prepared by Anderson and Olds (1989).

Reig (1986: 406) stated that 34 diploid chromosomes occur in *Bolomys*, including *B. amoenus*, *lactens*, *lenguarum*, *obscurus*, *lasiurus*, and an undescribed species, and that a 2 *n* of 34 was not known in any other Akodontini. However, later information summarized by Reig (1989: 270) showed 36 for *Necromys lactens* (*Bolomys* there considered as a junior synonym of *Necromys*, as explained below) and the occurrence of 34 in *Akodon caenosus*, *A. iniscatus*, and *A. dolores*.

The basis for using *Necromys* was nicely summarized for me by Reig (in litt., June 1989) as follows:

> In an informal journal [Circular Informativa Asociacion Paleontologica Argentina Nr 14: 4], Massoia (1985) claimed that the fossil *Necromys conifer* Ameghino, 1889, is a synonym of *Akodon benefactus* Thomas, 1919a, and that *Necromys* should be used instead of *Bolomys* Thomas, 1916d (= *Cabreramys* Massoia and Fornes, 1967). I have checked the original specimens of *Necromys conifer* at the 'Bernardino Rivadavia' Natural Sciences Museum in Buenos Aires, and I agree that they belong to a species very close, if not identical to *Bolomys obscurus*, which in my view includes *Akodon benefactus* and is generically inseparable from *Akodon amoenus*, the type species of *Bolomys* Thomas, 1916 (Reig, 1987). As *Necromys* Ameghino, 1889, has priority on *Bolomys* Thomas, 1916, the latter is a junior synonym of the former.

This is the basis for the use of *Necromys* by Reig, 1989: 270. (I have taken the liberty of adding some punctuation and making a few other trivial changes in the informally written paragraph of the letter.) More recently, Massoia and Pardinas (1993) have documented in considerable detail the review of Ameghino's muroid names that were informally summarized by Massoia in 1985. *Necromys conifer*, the type species of the genus, is considered to be a *nomen dubium*, or "name of unknown or doubtful application," as discussed by Mones (1989).

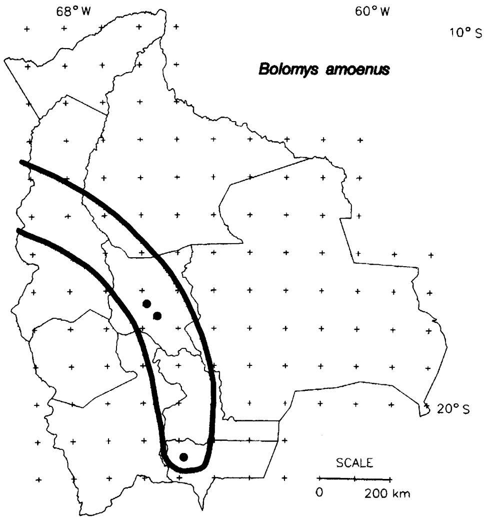


Fig. 720. Localities of known occurrence of *Bolomys amoenus*.

To clarify this question further, we need to know specific characters that uniquely associate the lectotype, a left maxilla with complete molar series, with *Bolomys obscurus* and the genus *Bolomys* (as diagnosed by Anderson and Olds, 1989: 15), characters at the specific level that exclude it from any other species of *Bolomys*, and that exclude it at the generic level from all those species of *Akodon* that are not associated with *Bolomys*. Until these questions can be answered, the use of *Bolomys* may as well be continued.

Bolomys amoenus (Thomas), 1900

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Akodon amoenus* was described by Thomas (1900e: 468), type locality Calalla, río Colca, near Sumbay, Peru, elevation 3500 m. Thomas (1916g: 340) first used the name combination *Bolomys amoenus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from near Rodeo (AM 260903–260906).

DISTRIBUTIONAL NOTES: The occurrences in Cochabamba are at elevations 3800, 3875, and 4000 m; the record in Tarija is at 3200 m. Known localities are listed below and mapped in figure 720.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

The only scientific name used for Bolivian specimens is:

Bolomys amoenus: Anderson and Olds, 1989: 16 (first Bolivian record). Anderson, 1993: 38 (general distributional records).

LOCALITIES (4) AND SPECIMENS (13): **Cochabamba:** 1721/6552, Colomi, 2 BM (unregistered skins only); 1740/6535, 7.5 km SE of Rodeo, 1 MSB; 1740/6535, 9.5 km by road SE of Rodeo, then 2.5 km on road to ENTEL antenna, 5 AM. **Tarija:** 2127/6452, Serranía Sama, 2 AM, 1 CBF, 2 MSB.

Bolomys lactens lactens (Thomas), 1918

Rufous-bellied Grass Mouse, Raton Ventrirufo

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Akodon lactens* was described by Thomas (1918: 188), type locality Leon, Jujuy, Argentina, elevation 1500 m.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from Tambo (AM 262761, 262764, 262767, 262769).

DISTRIBUTIONAL NOTES: Ranges from elevation 2100 m (Tambo) to 4000 m (near Rodeo in Cochabamba). Known localities are listed below and mapped in figure 721.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

The only scientific name used for Bolivian specimens is:

Bolomys lactens: Anderson and Olds, 1989: 16 (first Bolivian record). Anderson, 1993: 38 (general distributional records).

LOCALITIES (6) AND SPECIMENS (15): **Chuquisaca:** 1939/6406, 14 km N of Monteagudo, Cañon de Herida, río Bañado, 1 CBF. **Cochabamba:** 1741/6536, 7.5 km SE of Rodeo, 1 CBF. **Tarija:** 2127/6419, Rancho Tambo, 61 km by road E of Tarija, 4 AM, 1 MSB; 2127/6449, 1 km E of Tucumilla, 2 AM, 1 CBF, 2 MSB; 2127/6452, Serranía Sama, 1 AM, 1 CBF; 2128/6448, Erquis, 1 MSB.

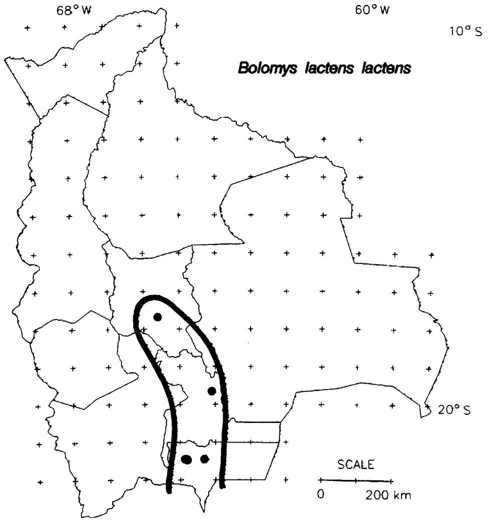


Fig. 721. Localities of known occurrence of *Bolomys lactens lactens*.

Bolomys lenguarum tapirapoanus (Thomas), 1898

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Mus lasiurus* was described by Lund (1841: 280), type locality Lagoa Santa, Rio das Velhas, Minas Berais, Brazil. Lund's (1840: 55) name in Bilton's translation is probably a nomen nudum. *Akodon lenguarum* was described by Thomas (1898c: 271), type locality "Waikthlatingwayalwa, Northern Chaco of Paraguay." *Zygodontomys tapirapoanus* was described by Allen (1916a: 528), type locality Tapirapoa, rio Sepotuba, Mato Grosso, Brazil. Gyldenstolpe (1932: 113) used the name *Zygodontomys lasiurus*. *Bolomys lenguarum* may prove to be a synonym of *B. lasiurus*, but most authors have equivocated on the question (as discussed by Anderson and Olds, 1989: 19).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from Santa Cruz (Anderson and Olds, 1989: 6).

DISTRIBUTIONAL NOTES: Widely distributed in the lowlands, and up to an elevation of at least 2030 m (near Mizque). Known localities are listed below and mapped in figure 722.

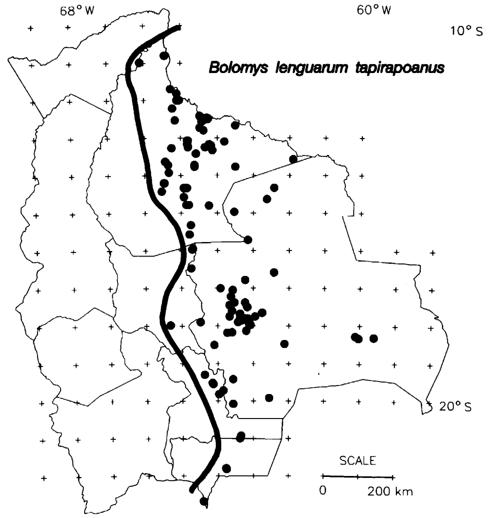


Fig. 722. Localities of known occurrence of *Bolomys lenguarum tapirapoanus.*

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

PARASITOLOGY: Yunker and Brennan (1964) reported two species of chiggers, *Miyatrombicula arandiai* and *Euschoengastia kunsi*, from San Joaquín. Brennan (1970: 811) reported two species of chiggers, *Eutrombicula batatas* from opposite Costa Marques and from Pampa de Meio and *Colicus kunsi* from 15 km S of La Horquilla.

Scientific synonyms used for Bolivian specimens are:

Akodon lenguarum: Thomas, 1925: 579 (Caraparí).

Zygodontomys (?*lasiurus*) *tapirapoanus*: Hershkovitz, 1962: 207 (Buenavista).

Zygodontomys lasiurus: Yunker and Brennan, 1964: 192 (chiggers, San Joaquín). Voss and Linzey, 1981: 41 (5 km E Mizque).

Zygodontomys sp.: Brennan, 1970: 811 (chiggers, noted under Parasitology above).

Bolomys lenguarum: Reig, 1978. Honacki et al., 1982. Reig, 1987: 357.

Cabreramys lasiurus: Massoia, 1980a: 179.

Bolomys lasiurus: Mares et al., 1981a: 117 (use of name combination). Voss, 1991: 111 (illustrations of skulls and teeth, presence of gall bladder, specimens from Puerto Caballo and Pampa de Meio).

Bolomys lasiurus lasiurus: Anderson, 1985b: 13 (name in list). Maedo and Mares, 1987: 591 (37 localities in Beni and Santa Cruz).

Bolomys lenguarum: Anderson, 1985b: 13 (name in list).

Bolomys lenguarum tapirapoanus: Anderson and Olds, 1989: 19 (first explicit use of name combination). Anderson, 1993: 38 (general distributional records). Anderson et al., 1993: 44 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (116) AND SPECIMENS (913): **Beni:** 1048/6525, 1.5 km NW Guayaramerin, 15 AM; 1048/6526, 1 mi [= 1.6 km] NW Guayaramerin, 10 AM; 1059/6606, Riberalta, 1 US; 1142/6516, 4 km S Santa Rosa, 3 AM; 1149/6506, 7 km N Lagoinha on río Mamoré, 1 AM; 1200/6506, Puerto Moré, 4 AM; 1200/6502, río Iténez, 20 km above mouth, 2 AM; 1213/6513, Cascajal, across river from, 2 AM; 1225/6428, río Iténez, bank opposite Principe da Beira [Brazil], 11 AM; 1228/6417, río Iténez, 1 km above Costa Marques [Brazil], 3 AM; 1229/6415, río Iténez, 4 km above Costa Marques, 5 AM; 1229/6418, río Iténez, 1.5 km below Costa Marques, 1 AM; 1229/6418, río Iténez, below Costa Marques, 2 AM; 1229/6417, río Iténez, bank opposite Costa Marques, 51 AM; 1230/6418, mouth of río Baures, 30 AM; 1230/6415, Pampa de Meio, 42 AM; 1232/6509, 17 km NNW Nuevo Berlin, 1 AM; 1234/6425, 15 km above Horquilla on río Machupo, 14 AM; 1240/6330, mouth of río Curiche, 6 AM; 1244/6428, Las Peñas, 4 FM, 1 US; 1248/6422, Nueva Calama, 1 US; 1304/6448, Camino Vilches, 8 FM; 1304/6449, San Joaquín, 26 FM, 7 US; 1306/6348, Boa Vista, 29 km NE San Joaquin, 3 US; 1310/6413, Cayoba, 1 US; 1310/6449, San Marco, 2 FM; 1312/6410, Cachuelita, 1 US; 1313/6448, Barranquita, 1 FM; 1315/6420, Piedras Blancas, 4 MNK; 1315/6448, Yutiole, 7 AM; 1316/6515, Exaltación, 3 FM; 1320/6408, Magdalena, province of Iténez, 3 US; 1325/6435, Cafetal, 1 US; 1334/6154, Remansos, 1 AM; 1338/6525, río Yacuma, 2 km from mouth, 1 AM; 1338/6526, río Yacuma, 4 km from mouth, 1 AM; 1343/6437, Lucumo, 45 km S of San Ramón, 1 MSB; 1343/6521, Puerto Caballo, 146 AM; 1346/6330, Lago Victoria, province of Iténez, 1 FM, 4 US; 1346/6437, Motacu, 50 km S of San Ramón, 1 MSB; 1355/6520, río Mamoré, 4 AM; 1412/6528, Fortaleza, province of

Yacuma, 8 US; 1412/6527, Palacio Ranch, 90 km S Santa Ana, province of Ykuma, 2 US; 1420/6455, 10 km W San Pedro, 8 AM; 1420/6450, San Pedro, 1 FM; 1425/6532, La Esperanza, 7 US; 1434/6455, 23 km W San Javier, on río Mamoré, 12 AM; 1447/6451, río Ibare, 26 km from mouth, 1 AM; 1447/6447, Trinidad, 3 CBF (owl pellets); 1448/6414, Casarabe, 4 AM, 1 MSB; 1519/6444, Camiaco, 4 AM; 1534/6446, 15 km S Limoquije, 1 AM; coordinates unknown, río Iténez, 1 AM; coordinates unknown, Colina, Mamore province, 3 MSB. **Chuquisaca:** 1918/6422, 9 km by road N of Padilla, 1 AM, 1 MNLP; 1931/6409, Monte Cantu, province of Tomina, 1 US; 1933/6408, Río Limón, 12 AM, 6 MNLP, 10 MSB; 1943/6351, 2 km E of Chuhuayaco, 1 AM; 1949/6358, 2 km SW of Monteagudo, 3 AM, 1 MNLP, 1 MSB; 2056/6321, 2 km S and 10 km E of Tiquipa, Laguna Palmer, 12 AM. **Cochabamba:** 1558/6442, mouth of río Chapare, 1 AM; 1759/6519, 5 km E Mizque, 5 UMMZ. **Santa Cruz:** 1420/6225, PRNB, 1 MNK; 1438/6237, Perseverencia, 5 MNK; 1458/6332, Laguna Pajaral, 3 MNK; coordinates unknown, La Forestal, Florida province; 1 MNK; 1543/6309, 6 km by road W of Ascención, 2 AM, 13 MSB; 1557/6441, 2 km N of mouth of río Chapare, 1 AM; 1628/6444, río Ichilo, 52 km S of mouth of río Chapare, 1 AM; 1635/6225, San Ramón, Castedo, 7 MNK; 1635/6225, 2 km N and 10 km E of San Ramón, 1 AM, 1 MNK; 1635/6225, 14 km NE of San Ramón, 1 AM, 1 MNK; 1647/6314, Estancia Cachuela Esperanza, 21 AM, 3 MSB; 1700/6355, Ayacucho, 2 AM; 1713/6338, 6 km N of Buen Retiro, 9 AM, 2 MSB; 1703/6335, 7 km N Santa Rosa, 1 AM; 1723/6314, 3 km SE Montero, 1 km N of Villa Copacabana, 1 AM, 2 MSB; 1723/6332, San Miguel Rincón, 13 AM, 10 MSB; 1727/6340, Buenavista, 19 BM, 5 MACN (tentative, skins only); 1730/6310, Warnes, province of Warnes, 17 US; 1736/6336, San Rafael de Amboró, 13 AM, 4 MSB; 1739/6245, 3.5 km W of Estación Pailón, 7 AM, 1 MSB; 1740/6327, Wendá Patriota, 1 MNK; 1741/6322, Terebinto, 3 MNK; 1741/6323, 2 km W of Terebinto, 1 MNK; 1745/6257, Cotoca, 1 AM, + other owl pellet material in La Paz; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 1 AM, 2 MSB; 1747/6322, 3 km SW Las Cruces, 1 AM; 1748/6310, Santa Cruz, province of Ibáñez, 23 US; 1748/6310, "Santa Cruz" (assumed to be the city), 1 US; 1748/6310, Santa Cruz de la Sierra, 1 AM, 12 from owl pellets in La Paz; 1748/6314, Km 7 on Santa Cruz to Cochabamba highway, 1 MSU; 1751/6309, Palmar, province of Ibáñez, 4 US; 1751/6320, Ayacucho, province of Ibáñez, 5 US; 1753/6307, Las Lomitas, 15 km S of Santa Cruz, 1 CBF, 6 MSB; 1754/6326, Km 15 (SW) from Santa Cruz, 1 US; 1754/6429, Comarapa, 9 BM; 1755/6308, 15 km S of Santa Cruz, 17 MSB; 1 Hayward coll.; 1755/6308, 15 km S of Santa Cruz, Las Lomitas, 3 MSB; 1758/6305, 27 km SE of Santa Cruz, 4 MSB; 1808/6312, 7 km E and 3 km N Ingeniero Mora, 22 AM; 1810/6336, Vermejo, 8 AM; 1811/6344, 1 km NE Estancia Cuevas, 2 MNK; 1816/6007, 7 km N and 38 km W of Roboré, 8 AM, 1 MSB; 1818/5936, 4 km N and 1 km W of Santiago de Chiquitos, 16 AM, 5 MSB; 1819/6002, 29.5 km W of Roboré, 1 AM; 1828/6207, 8 km SE of Tita, 9 AM, 6 MSB; 1830/6406, Vallegrande, province of Vallegrande, 1 US; 1925/6334, Gutierrez, province of Cordillera, 1 US; 1955/6233, Perforación, 50 km S of Cerro Colorado, 2 EBD; 2005/6334, near Camiri, 1 CAS; coordinates unknown, Nueva Moka, 2 MACN, and Huandá, 1 MSB. **Tarija:** 2100/6323, 1 km S of Camatindi, 1 AM, 1 CBF, 1 MSB; 2148/6347, 3 km WNW of Carapari, 2 AM; 2149/6346, Caraparí, 2 BM (25.2.1.51 and 52); 2241/6426, río Lipeo, 5 ANSP.

Genus *Chroeomys* Thomas, 1916g

For current recognition of *Chroeomys* at the generic level, see Patton et al. (1989) and Smith and Patton (1991: 101). *Chroeomys andinus* is included on the basis of biochemical data. Morphological data to support this generic placement need to be published.

Chroeomys andinus (Philippi), 1858

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Mus andinus* was described by Philippi (1858: 77), type locality high Andes, province of Santiago, Chile. Smith and Patton (1991: 101) first used the name

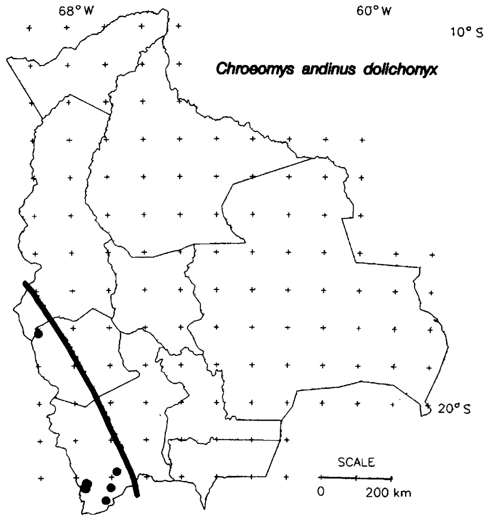


Fig. 723. Localities of known occurrence of *Chroeomys andinus dolichonyx.*

Chroeomys andinus. Hesperomys dolichonyx was described by Philippi (1896: 21), type locality San Pedro de Atacama, province of Antofagasta, Chile. *Akodon andinus lutescens* and *A. a. dolichonyx* were synonymized by Yañez et al., 1979. However, Myers et al. (1990: 70) regarded *lutescens* as conspecific with *Akodon puer.* Osgood (1943: 179) first used the name combination *Akodon andinus dolichonyx.* When enough specimens have been obtained from the Bolivian Altiplano, a further study of geographic variation would be productive.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: *Chroeomys andinus* is a small, delicately built mouse with pale brownish or agouti dorsal pelage, venter pale buff, feet pale gray. Feet are paler than dorsum of body but do not contrast greatly with it. The specimen of *C. a. dolichonyx* from Lipez is reddish gray and long-haired.

Measurements in tables 18 and 20 are of specimens from Lipez (BM 26.6.12.57) and 2218/6744 (MSB 57086).

DISTRIBUTIONAL NOTES: Occurs at elevations above 4000 m in the drier parts of the Altiplano. Known localities are listed below and mapped in figure 723.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Chroeomys andinus dolichonyx (Philippi), 1896

Akodon jucundus: Thomas, 1926d: 195 (Lipez).

Akodon andinus dolichonyx: Anderson, 1985b: 12 (name in list). Scrocchi et al., 1986: 113 (presumably on the geographic grounds that the species occurs both north and south of central and western Bolivia, "con bastante seguridad," concluded that it occurs there also, although no specimens were known to them). Anderson, 1993: 38 (general distributional records). Yensen and Tarifa, 1993: 55 (one from 1 km SE of Sajama and 21 from owl pellets from north of Cerro Huincurata). Yensen et al., 1994: 407 (1808/6858).

"Akodon" andinus: Patton and Smith *in* Young and Valencia, 1992: 103 (reluctance to place in *Chroeomys* with *C. jelskii* although both said to belong to a monophyletic clade comprising a sister-group to other *Akodon*).

LOCALITIES (9) AND SPECIMENS (25): **Oruro:** 1808/6858, 1 km SE of Sajama, 1 CBF. **Potosí:** 2151/6651, Lipez, 1 BM; 2209/6743, 2 km N of ENDE camp, 1 MNLP; 2210/6741, 3.5 km E of ENDE camp, 3 MNLP; 2210/6742, 2 km E of ENDE camp, Laguna Colorada, 3 AM; 2217/6701, Khastor, 2 MNLP; 2217/6747, Laguna Colorada, 5 EBD; 2218/6744, 21 km SE of ENDE camp, Laguna Colorada, 1 MSB; 2237/6710, Laguna Kalina, 8 EBD.

Chroeomys jelskii (Thomas), 1894

Colorful Grass-mouse might be an appropriate vernacular name.

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Akodon jelskii* was described by Thomas (1894b: 360), type locality Junín, in Junín Department, Peru. *Akodon pulcherrimus* was described by Thomas (1897c: 549), type locality Puno, Peru. *Akodon bacchante sodalis* was described by Thomas (1913a: 141), type locality "Cerro de la Lagunita, E[ast] of Maimara, 4500 m," province of Jujuy, Argentina. Sanborn (1947b: 142) first used the name combination *Akodon (Chroeomys) jelskii sodalis.*

MORPHOLOGICAL CHARACTERS AND COMPARISONS: *Chroeomys jelskii* is immediately recognizable on the basis of external features, namely the coloration. There are white markings on and behind the ears. The whitish ventral color extends up onto the rump. The feet are pale, and the ankles, and in some cases larger areas on the feet, have an orange hue that also appears on the nose. The dark dorsum is relatively sharply demarked from the whitish venter. The tail is distinctly bicolored and may show a lateral stripe of orange.

Cranially, the most noticeable distinguishing features are the relatively large bullae and braincase, the projecting nasals, and the narrow interorbital area.

The following characteristics of the Bolivian subspecies are from Sanborn (1947b: 136): face to around eyes suffused with ochraceous or reddish; ears, feet, and tail fulvous; well-defined postauricular spot; under parts white; *C. j. bacchante*. Same as *bacchante* but paler throughout, *C. j. sodalis*. A few reddish hairs around eye and on face; ears, feet, tail, and sides of muzzle reddish brown; underparts white; well-defined postauricular patch; *C. j. ochrotis*. No ochraceous or reddish around eyes or face; ears black, sides of muzzle reddish, *C. j. pulcherrimus*.

There are three melanistic individuals from Pongo, with blackish venters and feet, as well as dark dorsal pelage.

DISTRIBUTIONAL NOTES: Ranges in the highlands from elevation 2163 m (near Saynani) up to 4800 m (near Chacaltaya). Known localities are listed below and mapped in figure 724.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are given under subspecies below.

Chroeomys jelskii bacchante
(Thomas), 1902

Akodon bacchante Thomas, 1902a: 138 (type locality Choro, upper río Sécure, Department of Cochabamba, Bolivia).

Chroeomys bacchante: Thomas, 1916g: 340.

Chroeomys bacchante bacchante: Tate, 1932f: 23.

Chraeomys bacchante bacchante: Gyldenstolpe, 1932: 122.

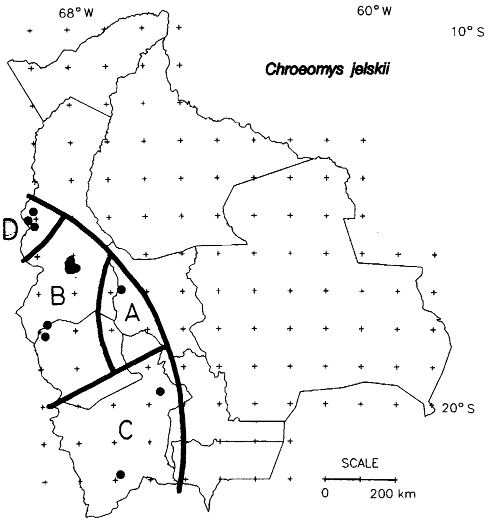


Fig. 724. Localities of known occurrence of four subspecies of *Chroeomys jelskii*, *C. j. bacchante* (A), *C. j. ochrotis* (B), *C. j. sodalis* (C), and *C. j. pulcherrimus* (D).

Akodon bacchante bacchante: Ellerman, 1941: 415.

Akodon (*Chroeomys*) *jelskii bacchante*: Sanborn, 1947b: 137.

Akodon jelskii bacchante: Anderson, 1985b: 12 (name in list).

Chroeomys jelskii bacchante: Anderson, 1993: 38 (general distributional records).

LOCALITIES (1) AND SPECIMENS (1): **Cochabamba:** 1656/6642, Choro, 1 BM (Thomas, 1902a).

Measurements in tables 18 and 20 are of the holotype from Choro (BM 2.1.1.66).

Chroeomys jelskii ochrotis
(Sanborn), 1947

Akodon (*Chroeomys*) *jelskii ochrotis* Sanborn, 1947b: 140 (type locality Huacullani, department of Puno, Peru; also Alaska Mine, Cumbre, Esperanza, Pongo). Cabrera, 1961a: 460.

Akodon jelskii: Yoneda, 1984c: 56 (Ulla Ulla). Mercado and Miralles, 1991: 295 (La Paz valley). Voss, 1991: 111 (presence of gall bladder in two specimens from Pongo).

Akodon jelskii ochrotis: Anderson, 1985b: 12 (name in list).

Chroeomys jelskii ochrotis: Anderson, 1993: 38 (general distributional records). Yensen and Tarifa, 1993: 55 (Quebrada Kohuiri). Yensen et al., 1994: 408 (1808/6857).

LOCALITIES (10) AND SPECIMENS (96): **La Paz:** 1607/6805, 0.5 km E of Saynani, 1 [collection uncertain]; 1612/6808, Lago Viscachani, 4 AM, 4 CBF, 4 MSB; 1617/6802, Alaska Mine, 7 AM; 1619/6758, Mina Lourdes, 3800 m, 3 AMNH, 1 CBF, 1 MSB; 1620/6808, Mount Chacaltaya, 4 UMMZ; 1620/6756, Pongo, 61 AM, 1 CBF; 1622/6803, La Cumbre, 1 AM, 1 IE; 1622/6807, Laguna Kellguani de Chacaltaya, 1 MNLP; 1749/6847, Esperanza, province of Pacajes, 1 FM. **Oruro:** 1808/6851, Quebrada Kohuiri, 1 CBF.

Measurements in table 20 are of specimens from Pongo (AM 72734–72736, 72787, 72790–72793).

Chroeomys jelskii pulcherrimus (Thomas), 1897

LOCALITIES (4) AND SPECIMENS (8): **La Paz:** 1448/6904, Pelechuco, 5 AM; 1502/6913, Cabaña at Ulla Ulla, 1 (Yoneda, 1984c); 1502/6913, Ulla Ulla, Reserva de Fauna, 1 MSB; 1512/6903, 2 km W Charazani, 1 AM.

Measurements in table 18 are of specimens from Pelechuco (AM 247783–247787).

Chroeomys jelskii sodalis (Thomas), 1913

Chroeomys bacchante sodalis: Thomas, 1926d: 195 (Lipez).

Chroeomys jelskii sodalis: Anderson, 1993: 38 (general distributional records).

LOCALITIES (2) AND SPECIMENS (8): **Potosí:** 1939/6540, Kirikari Mountains, 1 ANSP; 2151/6651, Lipez, 7 BM.

Measurements in tables 18 and 20 are of specimens from Lipez (BM 26.6.12.69 to 75).

Genus *Lenoxus* Thomas, 1909

Lenoxus apicalis (Allen), 1900

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. Originally named as *Oxymycterus apicalis* by Allen (1900c: 224); type locality "Juliaca, Peru, altitude 6000 feet."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from Ñequejahuira (AM 72604–72625, in part).

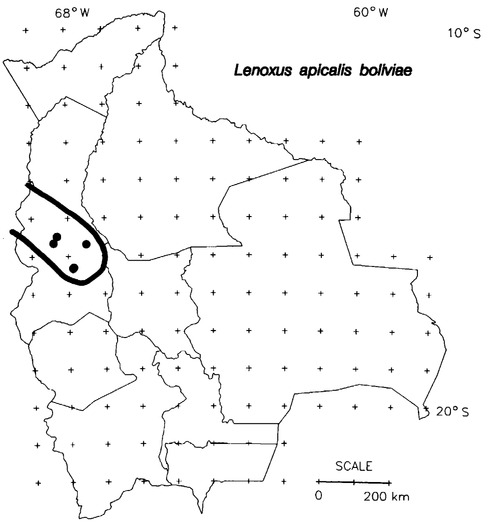


Fig. 725. Localities of known occurrence of *Lenoxus apicalis boliviae*.

DISTRIBUTIONAL NOTES: Occurs in the Yungas from 1525 m (Serranía Bella Vista) up to 2500 m (Unduavi Valley). Known localities are listed below and mapped in figure 725.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Lenoxus apicalis boliviae Sanborn, 1950

Lenoxus apicalis boliviae Sanborn, 1950: 16 (type locality Ñequejahuira, department of La Paz, Bolivia). Anderson, 1985b: 13 (name in list). Anderson, 1993: 38 (general distributional records). Lawrence, 1993: 118 (type locality).

LOCALITIES (5) AND SPECIMENS (35): **La Paz:** 1528/6818, Ticunhuaya, 1 AM; 1539/6824, Okara, 4 AM; 1541/6730, Serranía Bella Vista, 1 MSB; 1618/6751, río Unduavi, 4 AMNH, 2 CBF, 1 MSB; 1619/6752, Ñequejahuira, 21 AM, 1 Leningrad.

Genus *Oxymycterus* Waterhouse, 1837

Hocicudo

Originally proposed as a subgenus of *Mus*, with *M.* (*O.*) *nasutus* as type species (Water-

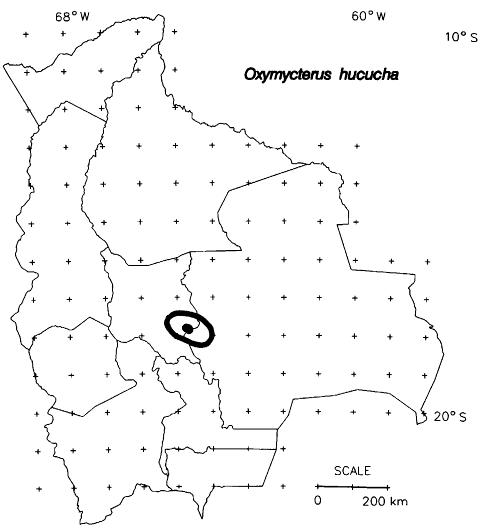


Fig. 726. Localities of known occurrence of *Oxymycterus hucucha.*

house, 1837: 21). Most of the Bolivian records of *Oxymycterus* are from the Yungas belt between elevations of 500 and 4000 m. None are known from Beni but records from lower elevations in Santa Cruz and in Brazil suggest a much wider distribution in the lowlands. Pilleri (1977: 47) mistakenly listed *Oxymycterus nasutus* for Bolivia.

PARASITOLOGY: Fonseca (1960: 94) reported ticks (Laelaptidae, *Cavilaelaps bresslaui, Cosmolaelaps bregetovae,* and *Eulaelaps halleri*) from *Oxymycteris doris* from Valleabajo (elevation 1500 m, coordinates unknown). I have not seen a voucher specimen to verify the identification of the host.

Oxymycterus hucucha

Hinojosa, Anderson, and Patton, 1987

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are AM 260583 and 246721, and MVZ 119948.

DISTRIBUTIONAL NOTES: Known from only four sites in a small area, from 2650 to 2989 m in elevation. Known localities are listed below and mapped in figure 726.

HABITAT: Known only from the Siberia cloud forest overlapping the border of Cochabamba and Santa Cruz.

No detailed Bolivian data are available on habits, behavior, food, or reproduction.

Only one scientific name has been used for the species.

Oxymycterus hucucha Hinojosa et al., 1987: 15 (type locality "28 km by road W of Comarapa (Santa Cruz) but in the department of Cochabamba, Bolivia, at 2800 m elev.; lat. 17°51′S and long. 64°40′W." Anderson, 1993: 38 (general distributional records). Lawrence, 1993: 118 (type locality). Hershkovitz, 1994: 30 (information from original description).

LOCALITIES (4) AND SPECIMENS (5): **Cochabamba:** 1748/6445, 101 km by road SE (not W as originally published; Hinojosa et al., 1987) of Epizana, 1 AM; 1751/6440, 28 km by road W of Comarapa, 1 AM; 1751/6440, 20 km E of Totora, 1 MVZ. **Santa Cruz:** 1749/6441, Serranía Siberia, 11 km by road NW of Torrecillas, 1 MNK, 1 MSB.

Oxymycterus inca Thomas, 1900

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Oxymycterus inca* was described by Thomas (1900d: 298); type locality "Perené, Ucuyali watershed, Department of Junin, E[astern]. Peru. Altitude 800 m." *Oxymycterus juliacae* was described by Allen (1900d: 223), type locality "Juliaca, Peru."

DISTRIBUTIONAL NOTES: Present, but seemingly uncommon, in the lowlands. Ranging up to 2500 m (in the Unduavi Valley). Known localities are listed below and mapped in figure 727. Hershkovitz (1994: 31) gave coordinates for the type locality of *O. iris* as 10°23′S, 65°24′W and mapped it there in Pando. However, the locality is in La Paz at about 15°15′S, 68°10′W.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are in the subspecies accounts below:

Oxymycterus inca doris Thomas, 1916

Oxymycterus doris Thomas, 1916h: 478 (type locality "Charuplaya, Upper Mamoré, 65°5′W., 16°S., Bolivia, Alt. 1350 m." department of Co-

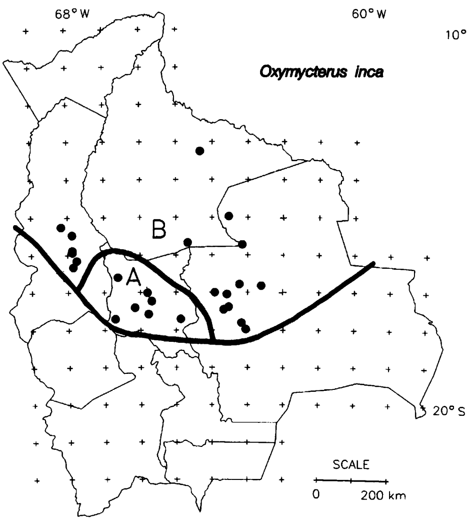


Fig. 727. Localities of known occurrence of two subspecies of *Oxymycterus inca*, *O. i. doris* (A) and B. *O. inca iris*.

chabamba). Gyldenstolpe, 1932: 130. Hershkovitz, 1994: 29 (Charuplaya).

Oxymycterus juliacae: Thomas, 1902a: 140 (Charuplaya). Neveu-Lemaire and Grandidier, 1911: 13 (Charuplaya). Hershkovitz, 1994: 32 (Charuplaya).

Oxymycterus inca doris: Anderson, 1985b: 13 (name in list). Anderson, 1993: 38 (general distributional records).

LOCALITIES (7) AND SPECIMENS (28): **Cochabamba:** 1636/6637, Charuplaya, 2 BM; 1700/6550, Yungas, 8 AM; 1714/6541, Incachaca, 4 AM, 4 CM, 2 FM; 1724/6609, Cochabamba, 1 FM; 1734/6546, Arani, 6 BM, 1 FM; 1742/6642, San Mateo, 1 MACN (not seen); 1742/6452, 20 mi [= 32 km] E Totora, 1 MVZ.

The source of the name *doris* was not given in the original description of *Oxymycterus doris*.

Measurements in tables 18 and 20 are of specimens from Incachaca (AM 38641—38644; CM 5083, 5245, 5251, 5261; FM 44862, 46152) and Charuplaya, the holotype (BM 2.1.1.95).

These localities range in elevation from 1250 to 3230 m.

Oxymycterus inca iris Thomas, 1901

Oxymycterus iris Thomas, 1901a: 183 (type locality "San Ernesto, near Mapiri, Upper Beni River, Alt. 1000 m," department of La Paz, Bolivia). Neveu-Lemaire and Grandidier, 1911: 13. Gyldenstolpe, 1932: 129. Hershkovitz, 1994: 231 (San Ernesto, Charuplaya).

Oxymycterus inca iris: Cabrera, 1961a: 467 (first use of name combination). Anderson, 1985b: 13 (name in list). Anderson, 1993: 38 (general distributional records). Anderson et al., 1993: 45 (vicinity of Santa Cruz de la Sierra).

Oxymycterus inca: Steppan, 1995: 112 (AM 260604, 260605, 263344–263347, 263349—263353, from 1647/6314, 1700/6355).

LOCALITIES (20) AND SPECIMENS (63): **Beni:** 1315/6420, Piedras Blancas, 1 MNK; 1540/6440, río Mamoré, Marbán, 2 MACN (not seen). **La Paz:** 1515/6810, San Ernesto, near Mapiri, 3 BM, 1 São Paulo (Vanzolini, in litt.), 2 US; 1515/6810, Mapiri, 4 AM, 6 BM; 1528/6752, Guanay, 1 AM; 1553/6752, 30 km N of Zongo, 6 UMMZ; 1556/6752, Zongo, 2100 m elevation, 1 MNLP; 1609/6745, Chijchijpa, 1 MSB; 1619/6751, río Unduavi, 1 MSB. **Santa Cruz:** 1458/6332, Laguna Pajaral, 2 MNK; 1543/6309, 6 km by road W of Ascención, 1 AM; 1647/6314, Estancia Cachuela Esperanza, 4 AM, 1 MSB; 1649/6237, Palmarito, río San Julian, 1 CM; 1700/6355, Ayacucho, 11 AM, 1 CENETROP, 1 MNK; 1703/6335, 7 km N Santa Rosa, 1 AM; 1723/6332, San Miguel Rincón, 1 MSB; 1727/6340, Buenavista, 1 BM; 1748/6310, Santa Cruz de la Sierra, 3 CM; 1758/6303, 27 km S of Santa Cruz, 4 [female and three embryos, collection uncertain]; coordinates unknown, Nueva Moka, 2 MACN (1 not seen).

The source of the name *iris* was not given in the original description of *Oxymycterus iris*.

These localities are all at elevations of 2100 m or less.

Measurements in tables 18 and 20 are of specimens from Estancia Cachuela Esperanza (AM 260603–260606, MSB 55347).

Oxymycterus paramensis Thomas, 1902

Hocicudo Parameño

DISTRIBUTIONAL NOTES: Occurs in the Yungas, generally at higher elevations than *O. inca*, from 900 m (near Cuyambuyo on the Argentine border) up to at least 4000 m (at Choquecamato and two other localities).

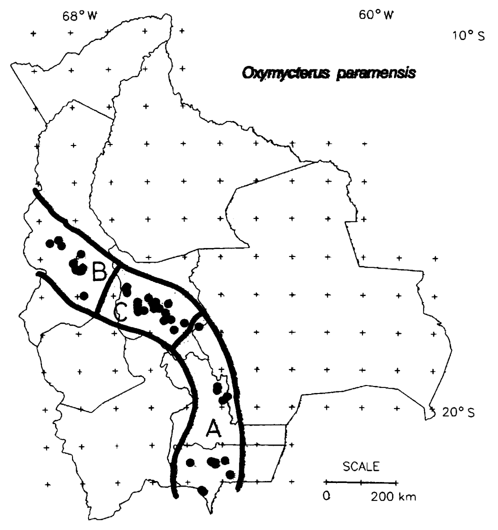


Fig. 728. Localities of known occurrence of three subspecies of *Oxymycterus paramensis*, *O. p. jacentior* (A), *O. p. nigrifrons* (B), and *O. p. paramensis* (C).

Known localities are listed below and mapped in figure 728.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

PARASITOLOGY: Specimens of the flea, *Neotyphloceras crassispina hemisus*, were reported from Padilla [1919/6420] (Hopkins and Rothschild, 1966: 136). I have not seen voucher specimens of the host.

Scientific synonyms used for Bolivian specimens are given under the subspecies below:

Oxymycterus paramensis jacentior Thomas, 1925

Oxymycterus paramensis jacentior Thomas, 1925: 580 (type locality "Carapari, 1000 m." in Tarija, Bolivia). Thomas, 1926b: 323 (Pino). Gyldenstolpe, 1932: 130. Cabrera, 1961a: 467. Anderson, 1985b: 13 (name in list). Anderson, 1993: 38 (general distributional records). Hershkovitz, 1994: 31 (Carapari).

Oxymycterus paramensis: Hopkins and Rothschild, 1966: 136 (fleas from Padilla). Musser and Carleton *in* Wilson and Reeder, 1993: 727 (noted, without further elaboration, that "placement of *jacentior* with this species merits reconsideration").

LOCALITIES (16) AND SPECIMENS (43): **Chuquisaca:** 1927/6407, Tola Orko, 40 km from Padilla, province of Tomina, 3 US; 1933/6408, Río Limón, 1 MNLP, 2 MSB; 1943/6351, 2 km E of Chuhuayaco, 2 AM; 1949/6358, 2 km SW of Monteagudo, 2 AM, 3 MNLP. **Santa Cruz:** 1751/6437, 21 km by road W of Comarapa, 1 MSB. **Tarija:** 2126/6355, Tapecua, 1 AM, 2 MSB; 2127/6419, Rancho Tambo, 61 km by road E of Tarija, 1 AM, 1 MSB; 2128/6418, Pino, 5 BM; 2129/6412, 5 km NNW of Entre Ríos, 1 AM; 2129/6455, 4.5 km E of Iscayachi, 1 AM; 2132/6412, Entre Ríos, province Oconnor, 1 US; 2148/6347, 3 km WNW of Caraparí, 2 AM, 1 CBF; 2149/6346, Caraparí, 2 BM (Thomas, 1925); 2213/6436, 8 km by road N Cuyambuyo, 2 UMMZ; 2213/6436, 4 km by road N Cuyambuyo, 2 UMMZ; 2216/6433, 3 km SE of Cuyambuyo, 3 AM, 4 CBF.

These localities are at elevations ranging from 980 to 2100 m.

Measurements in tables 18 and 20 are of specimens from Pino (BM 26.1.1.98 to 101) and 2213/6436 (UM 155868, 156096).

Oxymycterus paramensis nigrifrons Osgood, 1944

Oxymycterus paramensis nigrifrons Osgood, 1944: 197 (type locality Limbani, department of Puno, Peru; original description, no mention of Bolivia). Sanborn, 1950: 15 (río Aceramarca, Cocapunco, Ñequejahuira, Okara, Tacacomo). Anderson, 1985b: 13 (name in list). Anderson, 1993: 38 (general distributional records). Hershkovitz, 1994: 33 (northern Bolivia).

LOCALITIES (13) AND SPECIMENS (138): **La Paz:** 1530/6829, Cocapunco, 2 AM; 1535/6843, Tacacoma, 3 AM; 1539/6824, Okara, 1 AM; 1553/6752, 30 km by road N Zongo, 6 UMMZ; 1607/6805, 0.5 km E of Saynani, 3 AM, 1 CBF, 2 MSB; 1608/6806, Saynani, 2 AM, 2 CBF, 1 MSB; 1615/6750, 15 km by road NE Unduavi, 2 UMMZ; 1617/6802, Alaska Mine, 5 AM; 1618/6753, río Aceramarca, 12 AM; 1618/6801, río Aceromarca, 1 km S Yerbani, 1 UMMZ; 1619/6752, Ñequejahuira, 6 AM; 1619/6753, río Aceromarca, 6 AMNH, 3 CBF, 1 MSB; 1620/6756, Pongo, 79 AM.

Measurements in tables 18 and 20 are of specimens from Río Aceramarca (AM 4 M, 6 F), Ñequejahuira (AM 2 M, 3 F), 30 km

N of Zongo (UM 1556091), and 15 km NE of Unduavi (UM 156093).

Oxymycterus paramensis paramensis Thomas, 1902

Oxymycterus paramensis Thomas, 1902a: 139 (type locality Choquecamato, department of Cochabamba, Bolivia). Neveu-Lemaire and Grandidier, 1911: 14. Olds and Anderson, 1990: 72 (Caracato). Hershkovitz, 1994: 33 (Choquecamate).

Oxymycterus paramensis paramensis: Glydenstolpe, 1932: 130. Cabrera, 1961a: 468. Anderson, 1985b: 13 (name in list). Patterson, 1992: 27 (Liriuni, Toncoma, Ucho Ucho; photo of skull). Anderson, 1993: 38 (general distributional records).

Oxymycterus rufus: Steppan, 1995: 112 (misidentified specimens, AM 249003—249005, Caracato).

LOCALITIES (26) AND SPECIMENS (171): **Cochabamba:** 1646/6637, Alisuni, 1 BM; 1649/6639, Choro, 2 BM, 10 FM, 10 MACN (some not seen); 1655/6637, Choquecamato, 3 BM; 1704/6601, 4.4 km by road N of Tablas Monte, 1 AM; 1706/6529, Palmar, 3 MACN (1 not seen); 1710/6620, Ucho Ucho, 3 (Patterson, 1992: 28); 1711/6549, Chapare, 1 BM; 1713/6552, Corani, 1 AM, 1 MSB; 1713/6554, 13 km N of Colomi, 4 AM, 3 CBF, 3 MSB; 1714/6553, Poseidon, Laguna de Corani, 12.5 km N of Colomi, 4 AM, 3 CBF, 3 MSB; 1714/6557, 16.5 km NW of Colomi, 13 AM, 7 CBF, 9 MSB; 1715/6620, Toncoma, 3 (Patterson, 1992: 28); 1719/6620, Liriuni, 3 (Patterson, 1992: 28); 1721/6543, Cuchacancha, 5 AM; 1721/6552, Colomi, 6 FM; 1724/6609, Cochabamba, 1 MACN (not seen); 1726/6619, Vinto, 9 AM; 1728/6533, 15 mi [= 24 km] ESE Tiraque, 1 MVZ; 1739/6524, Pocona, 1 BM; 1740/6535, 7.5 km SE of Rodeo, 3800 m elevation, 4 MSB; 1740/6535, 9.5 km by road SE of Rodeo, then 2.5 km on road to ENTEL antenna, 3 AM; 1741/6536, 7.5 km SE of Rodeo, 4000 m elevation, 9 AM, 8 CBF, 8 MSB; 1745/6502, 17 km E of Totora, Tinkusiri, 3 AM, 3 CBF, 6 MSB; 1756/6519, río Mizque, near Mizque, 2 CBF. **La Paz:** 1659/6749, Caracato, 9 AM. **Potosí:** 1806/6608, 31 km from Acacio on road to Uncia, 2 CBF.

Measurements in tables 18 and 20 are of specimens from Colomi (FM 50985—50987, 51922–51924) and 1711/6549 (BM 34.9.2.166).

Oxymycterus sp. B

Oxymycterus sp. nov. B: Patterson, 1992: 27.

Specimen, 1. **Cochabamba:** 1711/6548, Locotal, 1 (Patterson, 1992: 27).

Oxymycterus, species not determined

These specimens have not yet been assigned to species or subspecies.

LOCALITIES (6) AND SPECIMENS (24): **Cochabamba:** 1731/6555, Cerro San Benito, 2 CM; coordinates unknown, Muellemuelle, 6 CM, 1 FM. **La Paz:** 1604/6800, 18 km by road N Zongo, Cuticucho, 5 UMMZ. **Santa Cruz:** 1634/6135, Zapial, 1 US; coordinates unknown, Cerro Hosana, 1 CM. **Department unknown:** locality unknown, 1 MACN (not seen).

TRIBE SCAPTEROMYINI REIG, 1980

Another member of this tribe that may eventually be discovered in the pantanal area of eastern Santa Cruz is *Scapteromys tumidus*.

Genus *Kunsia* Hershkovitz, 1966

Kunsia tomentosus tomentosus (Lichtenstein), 1830

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Mus tomentosus* was described by Lichtenstein (1830, pl. 33, fig. 1), type locality wooded area along the río Uruguay. Status was discussed by Hershkovitz (1966).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in table 18 are of two specimens (US 364760, EBD 8750). Skull measurements of two Bolivian specimens (Hershkovitz, 1966: 110) are greatest length, 52.5, 52.2; condylobasal length, 52.2 mm, 51.7; zygomatic breadth, 31.4, 29.4; interorbital breadth, 9.0, 9.2; braincase width, 19.7, 19.0; nasal length, 21.1, 19.2; incisive foramina, 11.6, 11.2; diastema, 15.1, 14.7; alveolar length of molar row, 9.7, 10.3; and width of M1, 3.5, 3.5.

DISTRIBUTIONAL NOTES: The species may not be so rare as the limited number of spec-

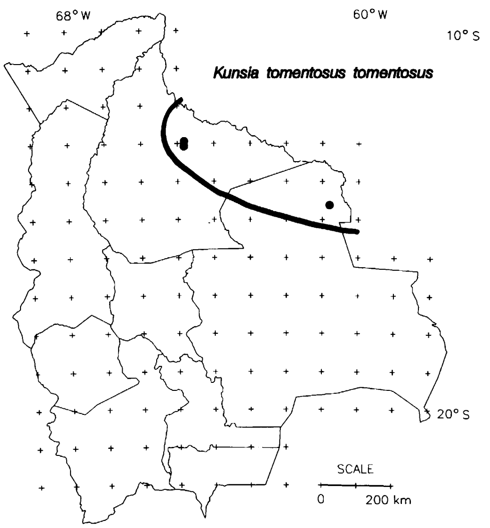


Fig. 729. Localities of known occurrence of *Kunsia tomentosus tomentosus*.

imens suggest. They are larger than most rodents taken in the traps usually used to sample small mammals. Known localities are listed below and mapped in figure 729.

HABITAT: "In an open savanna some 50 yards from a forested 'island' known as Isla Redonda de Caravana" (Hershkovitz, 1966). The other two Bolivian localities are in lowland savanna also.

HABITS AND BEHAVIOR: No data. Fossorial habits were inferred by Hershkovitz (1966: 117) from morphological features such as the enlarged claws of manus, relatively small ears, and short and scantily haired tail.

No Bolivian data are available on food or reproduction.

Scientific synonyms used for Bolivian specimens are:

Kunsia tomentosus tomentosus: Hershkovitz, 1966: 119 (San Joaquín and Caravana). Anderson, 1985b: 13 (name in list). Anderson, 1993: 38 (general distributional records).

Kunsia tomentosus: Ibáñez et al., 1994: 82 (first specimen from Santa Cruz). Steppan, 1995: 108 (FM 122710–122711).

LOCALITIES (3) AND SPECIMENS (4): **Beni:** 1255/6449, Isla Redonda de Caravana, ca. 15 km N of San Joaquín, 1 (Hershkovitz, 1966: 119; FM 122711); 1304/6449, San Joaquín, 1 (Hershkovitz, 1966: 119; FM 122710), 1 US (364760). **Santa Cruz:** 1437/6048, Km 45 E of Aserradero Moira, 1 EBD (8750).

SIGMODONTINAE INCERTAE SEDIS

Genus *Pseudoryzomys* Hershkovitz, 1959

TAXONOMIC REMARKS: *Pseudoryzomys* was named by Hershkovitz (1959b: 8), with type species *Oryzomys wavrini* Thomas, 1921b. Voss and Myers (1991) treated *Pseudoryzomys* as Sigmodontinae incertae sedis, at present best not assigned to tribe. They (p. 423) reported 56 diploid chromosomes. Braun (1993: 19) placed *Pseudoryzomys* as the sister-group for all other phyllotines in her cladogram and she considered *Pseudoryzomys* to be a phyllotine. Steppan (1995: 84) included *Pseudoryzomys* in the tribe Oryzomyini.

Pseudoryzomys simplex (Winge), 1887

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Hesperomys simplex* was described by Winge (1888: 11); type locality near Lagoa Santa in Minas Gerais, Brazil. *Oryzomys wavrini* was described by Thomas (1921b: 177); type locality Jesematathla, Paraguay. Voss and Myers (1991) used the name *Pseudoryzomys simplex* and saw "no point in retaining a subspecific nomenclature."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: In its original description (Thomas, 1921b), *Oryzomys wavrini* was characterized as "a middle-sized, coarse-haired, buffy-brown species, with a proportionately short tail," with unridged supraorbital edges, strongly concave front of zygomatic plate, and obsolescent cross-crotchets in the molars.

DISTRIBUTIONAL NOTES: Known localities, all in the lowlands, are listed below and mapped in figure 730.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Pseudoryzomys wavrini: Pine and Ranck, 1969: 618 (San Joaquín, Santa Ana).

Pseudoryzomys: Hershkovitz, 1972: 406 (San Joaquín).

Pseudoryzomys wavrini reigi Pine and Wetzel,

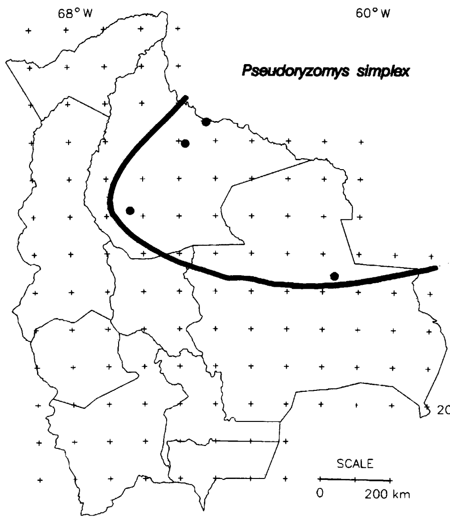


Fig. 730. Localities of known occurrence of *Pseudoryzomys simplex*.

1975: 651 (type locality Pampa de Meio, department of Beni, Bolivia; also San Joaquín, Santa Ana). Anderson, 1985b: 13 (name in list). *Pseudoryzomys simplex*: Voss and Myers, 1991: 418 (on use of name; karyology of specimen from 1451/6621). Braun, 1993: 48 (San Joaquín, Santa Ana). Anderson, 1993: 39 (general distributional records). Lawrence, 1993: 114 (Pampa de Meio). Steppan, 1995: 108 (FM 118810, San Joaquín).

LOCALITIES (5) AND SPECIMENS (6): **Beni:** 1230/6415, Pampa de Meio, 1 AM; 1304/6449, San Joaquín, 1 FM, 1 US; 1451/6621, Estación Biológica del Beni, 1 AM; 1451/6621, El Porvenir, 1 CBF; 1635/6040, Santa Ana, province of Velasco, 1 US.

Measurements in tables 18 and 20 are of specimens from 1451/6621 (AM 262048), 1304/6449 (FM 118810 and US 364749), 1637/6043 (US 390668), and 1230/6415 (AM 210054).

TRIBE PHYLLOTINI VORONTSOV, 1959

TAXONOMIC REMARKS: Genera represented in Bolivia are: *Andinomys*, *Auliscomys* (including *Maresomys*), *Calomys*, *Chinchillula*, *Eligmodontia*, *Galenomys*, *Graomys* (including *Andalgalomys*), *Neotomys*, and *Phyllotis*. The characters and diagnosis of the Tribe Phyllotini were reviewed and revised by Olds and Anderson (1990) and by Steppan (1995: 72), who reduced the number of characters hypothesized to be synapomorphies. Phylogenetic relationships among phyllotines were studied by Steppan (1993, 1995) and Braun (1993). Steppan (1995: 72) suggested the following subtribes: Phyllotina (*Phyllotis* in the strict sense and *Graomys* including *Andalgalomys*), with its sister-group Reithrodonina (*Auliscomys* including *Maresomys*, *Andinomys*, and *Reithrodon* groups), and the sister-group to the Phyllotina and Reithrodonina together, namely Calomyina including only *Calomys*.

Genus *Andinomys* Thomas, 1902

TAXONOMIC REMARKS: The cladistic sister-group to *Andinomys* is *Irenomys*, according to the analysis of Steppan (1993: 194). Cladistic relationships according to Braun (1993: 19; using parentheses to show sister-groups) are (((*Andinomys* and *Chinchillula*) *Punomys*) (*Reithrodon* and *Neotomys*)), with *Irenomys* four nodes farther down the tree.

Andinomys edax Thomas, 1902

Andean Rat or Rata Andina

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from near Camataqui (MVZ 120227–120232) and Sama (BM 26.1.1.6, 10, 11, and 14).

DISTRIBUTIONAL NOTES: Occurs in the highlands. Most localities are above elevation 3000 m, but the species ranges down as low as 1700 m (at Pino in Tarija). Not recorded from the most arid part of the Altiplano in Oruro and Potosí. Known localities are listed below and mapped in figure 731.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Andinomys edax edax Thomas, 1902

Scientific synonyms used for Bolivian specimens are:

Andinomys edax Thomas, 1902c: 116 (type locality "El Cabrado, between Potosí and Sucre, Bolivia" in the department of Potosí); 1902b: 225 (El Cabrado). Neveu-Lemaire and Grandidier, 1911: 12 (El Cabrado). Thomas, 1926b: 320 (Pinos, Sama); 1926d: 194 (Tupiza, Yuruma).

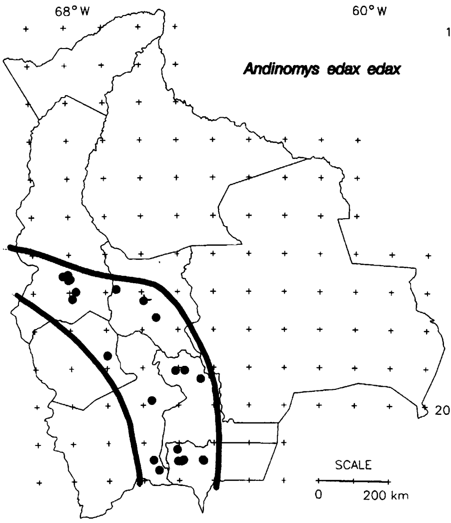


Fig. 731. Localities of known occurrence of *Andinomys edax edax*.

Gyldenstolpe, 1932: 97 (El Cabrado). Tate, 1932a: 16 (El Cabrado). Yoneda, 1984b: 12 (Collana). Olds and Anderson, 1990: 72 (Caracato). Voss, 1991: 12 (presence of gall bladder in two specimens from Caracato). Braun, 1993: 47 (10 km SW of Pazña). Steppan, 1995: 106 (four localities in Cochabamba, Potosí, and Tarija).

Andinomys edax edax: Anderson, 1985b: 13 (name in list). Mercado and Miralles, 1991: 295 (La Paz valley). Anderson, 1993: 40 (general distributional records).

LOCALITIES (23) AND SPECIMENS (69): **Chuquisaca:** 1904/6449, 12 km N and 11 km E of Tarabuco, 1 AM; 1905/6505, La Cabrada, 2 BM; 1918/6422, 9 km by road N of Padilla, 1 AM, 1 MNLP. **Cochabamba:** 1714/6557, 16.5 km NW of Colomi, 1 AM, 1 CBF, 1 MSB; 1656/6642, El Choro, province of Ayopaca, 1 FM; 1741/6536, 7.5 km SE of Rodeo, 1 AM, 1 CBF, 1 MSB. **La Paz:** 1632/6802, Orejuyo, 1 IE; 1634/6810, Khunuma, 1 IE; 1639/6758, Collana, 1 MNLP; 1640/6801, Valencia, 1 IE; 1659/6749, Caracato, 3 AM; 1710/6755, Huaraco, 1 IE (not seen). **Oruro:** 1840/6659, 10 km by road SW of Pazna, 2 UMMZ. **Potosí:** 1952/6545, 20 mi [= 32 km] S Potosí, 3 MVZ; 2127/6543, Tupiza, 3 BM (Thomas, 1926d); 2143/6534, Yuruma, 11 BM (Thomas, 1926d), 2 FM. **Tarija:** 2110/6503, 25 mi [= 40 km] SSE Camataqui, 6 MVZ; 2127/6419, Rancho Tambo, 61 km by road E of Tarija, 2 AM, 1 MSB; 2127/6452, Serranía Sama, 1 AM; 2128/6418, Pino, 2 BM; 2129/6455, 4.5 km E of Iscayachi, 1 AM, 1 CBF, 1 MSB; 2129/6457, 1 km E of Iscayachi, 1 MSB; 2129/6502, Sama, 12 BM.

Genus *Auliscomys* Osgood, 1915

TAXONOMIC REMARKS: Two species formerly included in *Auliscomys* have been placed in separate genera: *Loxodontomys micropus* of southern Chile and Argentina (Braun, 1993: 30; Steppan, 1993: 202, and 1995: 82) and *Maresomys boliviensis* (Braun, 1993: 32). However, the latter has been returned to *Auliscomys* by Steppan (1995: 84). Recent cladistic analyses by Braun (1993: 19) and Steppan (1993: 194; 1995: 84) provide different interpretations of relationships among *Galenomys garleppii* and three of the species formerly placed in *Auliscomys*, namely *A. boliviensis*, *A. pictus*, and *A. sublimus*. Using each set of parenthetical marks to enclose two sister-groups, in Braun's cladogram the relationships are ((*A. sublimis*, *A. pictus*)(*A. boliviensis*, *Galenomys garleppii*)). In Steppan's cladogram the relationships are (*Galenomys garleppii* (*A. boliviensis* (*A. sublimis*, *A. pictus*))). On the one hand, if Braun's interpretation is correct, then *Auliscomys* is paraphyletic unless *boliviensis* is removed and placed in a separate genus. If we do not wish to recognize genera thought to be paraphyletic, the proposal of *Maresomys* is warranted. If, on the other hand, Steppan's interpretation is correct, then *Auliscomys* is monophyletic (assuming the removal of *A. micropus* as noted in the account of *Auliscomys*) and no new name is needed to avoid paraphyly, although *Maresomys* could be used as a subgenus.

Subgenus *Maresomys* Braun, 1993

Auliscomys boliviensis
(Waterhouse, *in* Bridges), 1846

TAXONOMIC REMARKS: See discussion under the genus above.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from near Cruce Ventilla (AM 262772–262778).

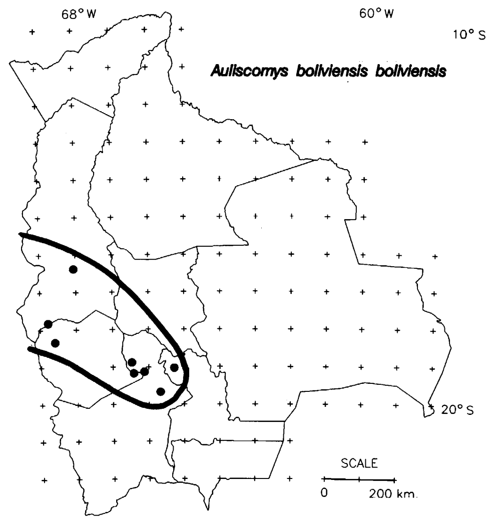


Fig. 732. Localities of known occurrence of *Auliscomys* (*Maresomys*) *boliviensis boliviensis*.

Distributional Notes: Occurs at elevations from 3450 m (near Cruce Ventilla) to 4770 m (La Cumbre). Known localities are listed below and mapped in figure 732.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Auliscomys boliviensis boliviensis (Waterhouse, *in* Bridges), 1846

Hesperomys Boliviensis Waterhouse, *in* Bridges, 1846: 9 (type locality a few leagues to the south of Potosí, department of Potosí, Bolivia).

Mus (*Phyllotis*) *Boliviensis*: Gray and Gray, 1847: 41 (one from "Bolivia" in Bridges's coll.).

Phyllotis boliviensis: Gerrard, 1862: 168 (one Bolivian skull). Thomas, 1902b: 223 (Potosí, Livichuco). Neveu-Lemaire and Grandidier, 1911: 12 (Potosí, Livichuco).

Auliscomys boliviensis boliviensis: Tate, 1932a: 16. Gyldenstolpe, 1932: 94 (Potosí). Anderson, 1985b: 13 (name in list). Anderson, 1993: 40 (general distributional records).

Phyllotis (*Auliscomys*) *boliviensis*: Sanborn, 1950: 9 (Esperanza).

Phyllotis boliviensis boliviensis: Pearson, 1958: 452 (four Bolivian localities). Hershkovitz, 1962: 412 (four Bolivian localities).

Auliscomys boliviensis: Mercado and Miralles, 1991: 295 (La Paz valley). Steppan, 1995: 106 (Esperanza).

Maresomys boliviensis: Braun, 1993: 40 (proposed new genus).

Localities (9) and Specimens (48): **Chuquisaca:** 1902/6517, Chuquisaca (Hershkovitz, 1962). **La Paz:** 1622/6803, La Cumbre, 1 IE; 1749/6847, Esperanza, province of Pacajes, 22 FM. **Oruro:** 1820/6836, Estancia Agua Rica, 40 km E and 22 km S of Sajama, 1 MSB; 1853/6628, Livichuco, 2 BM; 1908/6607, 7 km S and 4 km E of Cruce Ventilla, 8 AM, 2 MSB; 1910/6625, 45 km and 123° from Challapata, 1 AM. **Potosí:** 1940/6540, Potosí Peak, 2 US; coordinates uncertain, south of Potosí, 7 BM. **Department unknown:** "Bolivia" only, 2 BM.

Auliscomys pictus (Thomas), 1884

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Rheithrodon pictus* was described by Thomas (1884: 457); type locality "Junin," department of Junín, Peru. Thomas (1926a: 317) first used the name combination *Auliscomys pictus*.

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from near Ulla Ulla (AM 249013–249016 and Pongo AM (72727).

Distributional Notes: Occurs at elevations from 3690 m (Pongo) to 4820 m (Laguna Kellhuani). Known localities are listed below and mapped in figure 733.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: A female with three embryos was recorded in January, also three without embryos.

Scientific synonyms used for Bolivian specimens are:

Auliscomys pictus: Yoneda, 1984b: 12 (río Kaluyo, two localities); 1984c: 56 (Ulla Ulla). Anderson, 1985b: 13 (name in list). Mercado and Miralles, 1991: 295 (La Paz valley). Anderson, 1993: 40 (general distributional records).

Phyllotis (*Auliscomys*) *pictus*: Sanborn, 1950: 6 (Pongo).

Phyllotis pictus: Pearson, 1958: 449. Hershkovitz, 1962, 402.

Localities (11) and Specimens (30): **La Paz:** 1502/6913, 5 km E of Ulla Ulla, 4 AM; 1600/6830, Titicaca (coordinates uncertain), one from owl pellet in a collection in La Paz;

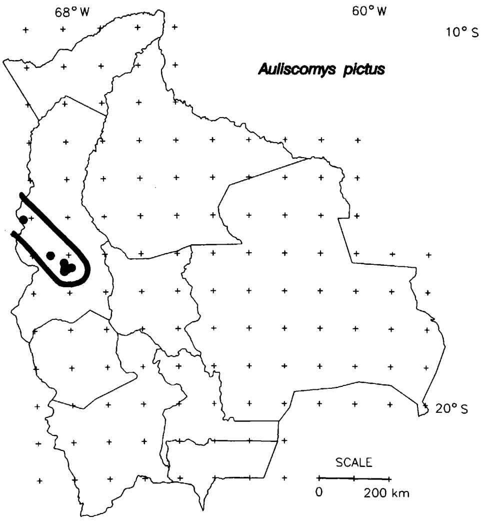


Fig. 733. Localities of known occurrence of *Auliscomys* (*Auliscomys*) *pictus*.

1612/6808, Lago Viscachani, 6 AM, 4 CBF, 4 MSB; 1618/6806, río Caluyo, 20 km NNE of La Paz, 3 MNLP; 1620/6756, Pongo, 1 AM, 1 ANSP; 1622/6803, La Cumbre, 1 IE; 1622/6807, Laguna Kellhuani, 1 IE; 1625/6807, río Caluyo, 10 km NNE of La Paz, 1 MNLP; 1626/6808, Laguna Limani, 1 IE; 1727/6737, Huaraco-Antipampa, 1 from owl pellet (Peñaranda); coordinates unknown, Jhacha Toloko, 1 IE.

Auliscomys sublimis (Thomas), 1900

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Phyllotis sublimis* was described by Thomas (1900e: 467), type locality "Rinconada Malo Pass, above Caylloma, on the Sumbay road, Peru. Altitude 5500 metres (nearly 18,000 feet)," department of Arequipa. *Euneomys* (*Auliscomys*) *leucurus* was described by Thomas (1919c: 129); type locality [Cerro de] "La Lagunita, Maimara, [province of] Jujuy," Argentina.

DISTRIBUTIONAL NOTES: Occurs at elevations from 3800 m (Taquesi) to 4740 m (Laguna Kellhuani). Known localities are listed below and mapped in figure 734.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: A nonpregnant female was recorded in September.

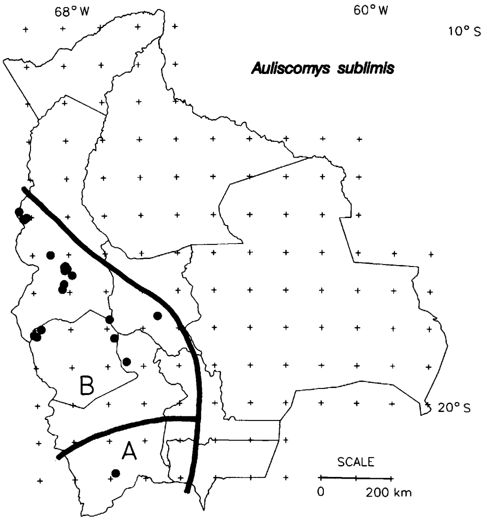


Fig. 734. Localities of known occurrence of two subspecies of *Auliscomys* (*Auliscomys*) *sublimis*, *A. s. leucurus* (A) and *A. s. sublimis* (B).

Scientific synonyms used for Bolivian specimens are in subspecific accounts below:

Auliscomys sublimis leucurus (Thomas), 1919

Auliscomys leucurus: Thomas, 1926d: 194 (Lipez).

Phyllotis sublimis leucurus: Pearson, 1958: 448 (Lipez). Hershkovitz, 1962: 421 (Lipez).

Auliscomys sublimis leucurus: Anderson, 1985b: 13 (name in list). Anderson, 1993: 40 (general distributional records).

LOCALITIES (1) AND SPECIMENS (8): **Potosí:** 2151/6651, Lipez, 8 BM.

Measurements in tables 18 are of specimens from Lipez (BM 26.6.12, 46, to 48, and 50).

Auliscomys sublimis sublimis (Thomas), 1900

Euneomys sublimis: Thomas, 1902a: 134 (Cosmini); 1902b: 226 (Livichuco). Neveu-Lemaire and Grandidier, 1911: 11 (Livichuco, Cosmini).

Phyllotis sublimis sublimis: Pearson, 1958: 448. Hershkovitz, 1962: 427.

Auliscomys sublimis: Yoneda, 1984b: 12 (río Kaluyo, two localities); 1984c: 56 (Ulla Ulla). Serrano and Anderson, 1986: 182 (río Suches). Mercado and Miralles, 1991: 295 (La Paz valley).

Auliscomys sublimis sublimis: Anderson, 1985b: 13 (name in list). Anderson, 1993: 40 (general distributional records). Yensen and Tarifa, 1993: 57 (two localities near Sajama).

LOCALITIES (23) AND SPECIMENS (167): **Cochabamba:** 1740/6535, 9.5 km by road SE of Rodeo, then 2.5 km on road to ENTEL antenna, 7 AM. **La Paz:** 1450/6920, río Suches, 46 from owl pellets (Serrano and Anderson, 1986); 1500/6908, Lago Puyu Puyu, 2 CBF; 1502/6913, 5 km E Ulla Ulla, 6 AM, 2 IE; 1502/6913, Ulla Ulla, 1 EBD; 1502/6913, Arroyo Canuma, 100 km N of Lake Titicaca, 2 EBD; 1503/6912, 7 km E Ulla Ulla, 6 AM; 1600/6830, Titicaca (coordinates uncertain), 4 from owl pellets in collection in La Paz; 1618/6806, río Caluyo, 20 km NNE of La Paz, 3 MNLP; 1620/6808, Laguna Kellhuani, 3 IE; 1622/6803, La Cumbre, 62 AM; 1625/6807, río Caluyo, 10 km NNE of La Paz, 4 MNLP; 1631, 6800, Chasquipampa, 1 MNLP; 1633/6755, Taquesi, 1 MNLP; 1647/6809, 20 mi [= 32 km] S La Paz, 1 MVZ; 1655/6812, Cosmini, 1 BM; coordinates unknown, Jhacha Toloko, 5 IE. **Oruro:** 1745/6655, 20 mi [= 32 km] NE Oruro, 1 MVZ; 1759/6849, Sajama, 1 MNLP; 1808/6902, 5 km N of Sajama pueblo, 1 CBF; 1810/6857, 4.5 km S of Sajama, 1 CBF; 1815/6648, 3 km NE of Huanuni, 1 AM; 1853/6628, Livichuco, 2 BM.

Measurements in tables 18 and 20 are of specimens from 7 km E of Ulla Ulla (AM 247856, 247859–247860, 247864–247866) and near Rodeo (AM 260915–260917, 260918–260921).

Genus *Calomys* Waterhouse, 1837

Vesper Mouse, Laucha

TAXONOMIC REMARKS: Originally proposed as a subgenus of *Mus*, with *M.* (*C.*) *bimaculatus* as type species and including *M. elegans* and *M. gracilipes* (Waterhouse, 1837: 19). An unpublished review of the genus is that of Olds (1988), and some of her views have been reflected in subsequent publications by others. A different treatment was that of Musser and Carleton (*in* Wilson and Reeder, 1993: 697), who regarded *Calomys boliviae* and *C. callosus*, with *C. venustus* as a synonym, as separate species. Phylogenetic relationships were examined in a cladistic analysis by Steppan (1993: 194). The five species of *Calomys* included in his analysis do tend to cluster, the least certain member of the cluster being *C. sorellus* of Peru. All of these *Calomys* are in basal offshoots from the larger clade including all other phyllotines.

Calomys sorellus of Peru may also inhabit Bolivia, but no specimens have been found. The most probable area would be near the Peruvian border just east of Lake Titicaca. *Calomys sorellus* differs from *C. callosus* and *C. lepidus* as noted in the accounts of those species. From *C. laucha*, *C. sorellus* differs in having supraorbital borders that are parallel or slightly divergent midfrontally and that may be squarish but never form ledges (Hershkovitz, 1962: 137, 140). *C. sorellus* is generally larger than *C. laucha* and has long, soft, lax pelage and thick underfur. Whitish postauricular tufts may be present as in *C. laucha*. Upper parts are ochraceous to tawny mixed with black, an ochraceous lateral line sometimes present, tip of muzzle usually ochraceous, underparts gray or with weak buffy hue. The interparietal is narrow anteroposteriorly.

Calomys callosus (Rengger), 1830

Laucha grande

TAXONOMIC REMARKS: The name most commonly used for Bolivian specimens has its type locality outside of Bolivia. *Mus callosus* was described by Rengger (1830: 231), type locality río Paraguay, north of Villa Real, Paraguay. Cabrera (1961a: 477) used the name *Calomys callosus callosus*. Pearson and Patton (1976: 343) found a different karyotype ($2n = 50$) in their Bolivian sample than in *C. callosus* from Paraguay ($2n = 36$). Assuming that two species are involved, these authors tentatively used the name *C. fecundus* for the Bolivian sample. This usage was followed by Vitullo et al. (1990). Several taxonomic and nomenclatorial questions need to be resolved here. Are the populations in eastern Bolivia that have been commonly referred to *C. callosus* conspecific with those at the type locality in Paraguay? Karyotypic data suggest that they are not. If not, what name should be used? How many species of large *Calomys* inhabit Bolivia? If so, what

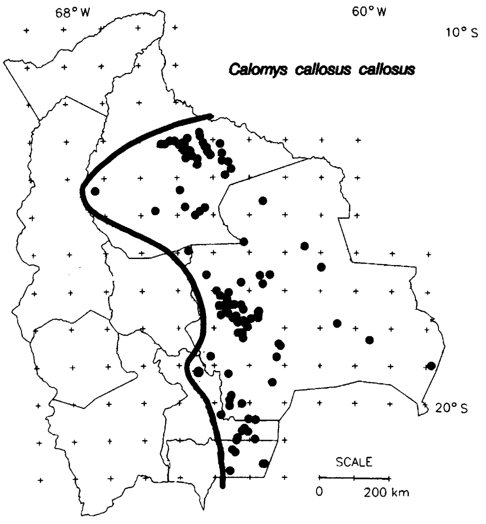


Fig. 735. Localities of known occurrence of *Calomys callosus callosus.*

names should be used for them? I have used the names *C. callosus* and *C. venustus*, with *C. boliviae* and *C. fecundus* as synonyms of *C. venustus* (as did Olds, 1988). Musser and Carleton (*in* Wilson and Reeder, 1993: 697) recognized *Calomys boliviae*, with *fecundus* a synonym, as a species separate from *C. callosus*. They listed *venustus* as a synonym of *C. callosus* but noted, however, that the "relationship and possible priority of *venustus* with respect to *boliviae* and *fecundus* especially merits study." If the names *C. callosus*, *C. boliviae*, *C. fecundus*, and *C. venustus* do not apply to the lowland Bolivian populations, then *C. muriculus* is the next available name. See taxonomic remarks also in the account of *C. venustus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from Laguna Palmar and Tarija department (Olds, et al. 1987: 10).

DISTRIBUTIONAL NOTES: Common and widespread in the lowlands, ranging up to at least elevation 2050 m (at 1912/6427 in Chuquisaca). Known localities are listed below and mapped in figure 735.

No Bolivian data are available on habitat, habits, behavior, or food.

PARASITOLOGY: *Calomys callosus* is the host of the Machupo virus that causes Bolivian hemorrhagic fever (Johnson et al., 1965; Johnson et al., 1967: 143). Fonseca (1960: 93) reported an ixodid tick, *Amblyomma* sp., from "*Hesperomys muricolus*" from Cabezas (1846/6324). He reported from *H. muriculus* three laelaptid ticks, *Gigantolaelaps wolffsohni* from Cabezas, *G. oudemansi* from Buen Retiro (1717/6338), and *Mysolaelaps heteronychus* from Agua Hedionda (2147/6422). Fonseca (1960: 114) reported another laelaptid tick, *Schistolaelaps mazzai*, from Cabezas and Villa Montes (2115/6330). Fonseca (1960: 130) also reported *Bdellonyssus vitzthumi* (Macronyssidae) from Cabezas. Yunker and Brennan (1964: 192) reported four chiggers, *Miyatrombicula arandiai*, *Euschoengastia kunsi*, *E. mackenziei*, and *E. johnsoni* from San Joaquín. Specimens of several species of fleas were reported: *Neotyphloceras crassispina hemisus* from Serrano (Hopkins and Rothschild, 1966: 136), *Polygenis* (*Gephyropsylla*) *klagesi samuelis* from Buen Retiro and Cabezas (Smit, 1987: 250), and *Polygenis* (*Polygenis*) *bohlsi bohlsi* (Smit, 1987: 296). I have not seen a voucher specimen to verify any of these host identifications.

REPRODUCTION: Data for 70 females include only six pregnant specimens, taken in May, June, and September, with 3, 5, 5, 5, 7, 7 embryos, mean 5.3. Nonpregnant females were recorded for June (4), July (29), August (17), September (10), and October (4). Five young were recorded in April.

Scientific synonyms used for Bolivian specimens are:

Calomys callosus callosus
(Rengger), 1830

Oryzomys callosus: Thomas, 1898b: 3 (San Francisco).

Hesperomys callosus boliviae: Osgood, 1916: 207 (Trinidad).

Hesperomys muriculus Thomas, 1921f: 623 (type locality "San Antonio, Parapiti," department of Santa Cruz, Bolivia). Tate, 1932a: 18. Gyldenstolpe, 1932: 76. Fonseca, 1960: 106, 107, 114 (ectoparasites, Buen Retiro, 1717/6338; Cabezas, 1849/6324; Agua Hedionda, 2147/6429; and Villa Montes, 2115/6330). Hopkins and Rothschild, 1966: 136 (fleas from Serrano [1906/6422]).

Hesperomys muricolus: Fonseca, 1960: 93, 130 (misspelling; ectoparasites, Cabezas, 1849/6324).

Calomys callosus callosus: Cabrera, 1961a: 477. Hershkovitz, 1962: 166, 171 (Trinidad, San Carlos, Buena Vista, San Antonio, Villa Montes). Anderson, 1985b: 13 (name in list). Anderson et al., 1993: 45 (vicinity of Santa Cruz de la Sierra).

Calomys muriculus: Cabrera, 1961a: 481 (San Antonio). Williams and Mares, 1978: 197 (Santa Cruz de la Sierra, Puerto Suárez).

Calomys fecundus: Pearson and Patton, 1976: 343 (laboratory stock from 160 km N Trinidad). Anderson, 1985b: 13 (name in list). Vitullo et al., 1990: 101 (discussed the results of Pearson and Patton).

Calomys callosus: Johnson et al., 1967: 143 (as host of Machupo virus). Dewsbury et al., 1980: 146 (laboratory stock derived from San Joaquín). Voss, 1991: 22, 23, 24, 27, and 111 (illustrations of skulls and teeth, presence of gall bladder, in specimens from at or near Titi, Villa Montes, Cachuela Esperanza, and Tiquipa). Corbet and Hill, 1991: 160 (name in list, as from "Bolivia"). Patterson, 1992: 28 (El Consuelo). Musser and Carleton *in* Wilson and Reeder, 1993: 698 ("E Bolivia"). Anderson, 1993: 39 (general distributional records). Steppan, 1995: 104 (localities in Beni, Santa Cruz, and Tarija).

Hesperomys [= *Calomys*] *muriculus* Smit, 1987: 250, 296 (fleas from Buen Retiro and Cabezas).

LOCALITIES (135) AND SPECIMENS (2829): **Beni:** 1248/6422, Nueva Calama, 1 US; 1254/6421, Teremaca, 2 US; 1257/6442, Montevideo, 20 km NE San Joaquín, 10 US; 1301/6503, Providencia, 6 FM; 1301/6511, Santa Rosa, 5 FM; 1304/6416, Acapulco, 8 FM; 1304/6448, Camino Vilches, 1 FM; 1304/6449, San Joaquín, 1257 FM, 2 MVZ, 447 US; 1304/6449, San Joaquín, 1 km S Lake Saramuchyqui, 1 AM; 1304/6449, San Joaquín, 100 mi [= 161 km] N Trinidad, 2 MVZ; 1306/6348, Boa Vista, 1 US; 1306/6448, San Juan de Fribol, 6 FM; 1306/6525, Mangal, 25 km NW Exaltación, 1 US; 1306/6519, Santiago, 3 FM; 1307/6447, 160 km N Trinidad (Pearson and Patton, 1976); 1307/6456, Las Moscas, 4 FM; 1310/6449, San Marco, 3.2 km SW San Joaquín, 4 US; 1310/6413, Cayoba, 1 US; 1312/6410, Cachuelita, on río Itonamas, 2 US; 1313/6448, Barranquita, 2 FM; 1315/6448, Yutiole, 2 AM, 7 FM, 2 US; 1315/6449, Totai, 18 US; 1317/6438, Huerrasca, 10 km E San Ramón, 18 US; 1317/6443, San Ramón, 1 FM; 1317/6448, Yuatre, 1 FM; 1318/6409, La Granja, 1 US; 1320/6408, Magdalena, province of Iténez, 8 FM, 53 US; 1321/6345, El Mojon, 8 FM; 1323/6440, Cabrera, 2 US; 1323/6442, río Negro, 2 US; 1324/6404, Achachairu, on río Itonama, 2 US; 1324/6442, Chaco Lejo, 20 km SE San Ramón, 7 US; 1325/6435, Cafetal, 20 km SE San Ramón, 15 US; 1325/6435, Santa Teresita, SE San Ramón, 9 US; 1325/6435, Tacuaral, 20 km SE San Ramón, 3 US; 1329/6445, Lucuma, 6 leagues S San Ramón, 1 US; 1330/6426, Estancia Bolpebra, 2 MSB; 1333/6345, Huacaraje, province of Iténez, 1 US; 1335/6335, Baures, 8 FM; 1339/6426, Estancia El Valle, 1 MSB; coordinates uncertain, Estancia Ponderosa, 1 MSB; 1346/6330, Lago Victoria, 1 FM; 1356/6340, El Carmen, 1 AM; 1420/6455, Mamoré River, ca. 10 km W of San Pedro, 1 AM [214598]; 1420/6715, El Consuelo, 8 (Patterson, 1992: 28); 1447/6447, Trinidad, 1 FM; 1448/6414, Casarabe, 2 AM; 1454/6422, 6 km W of Casarabe, 1 AM; 1453/6536, San Ignacio, province of Moxos, 2 US; 1500/6430, San Andrés, 2 FM; coordinates uncertain, Arruda, 1 FM; coordinates uncertain, Centenela, 3 FM; coordinates uncertain, Gualeva, province of Iténez, 1 US; coordinates uncertain, Mudele, 3 US; coordinates uncertain, Valparaiso, 1 US; coordinates uncertain, "Beni" only, 2 US (not seen). **Chuquisaca:** 1912/6427, 11 km N and 16 km W of Padilla, 1 AM; 1943/6351, 2 km E of Chuhuayaco, 13 AM, 5 MNLP, 5 MSB; 2019/6349, Tacuara, in vicinity of Monteagudo, 1 FM; 2041/6309, 10 km NE of Porvenir, 1 AM; 2045/6313, Porvenir, 1 AM, 1 MSB; 2046/6303, 3.8 km by road E of Carandayti, 3 AM, 2 MSB; 2056/6321, 2 km S and 10 km E of Tiquipa, Laguna Palmer, 54 AM; 2058/6251, 30 km SE of Carandaiti, 16 LACM; **Santa Cruz:** 1438/6237, Perseverencia, 3 MNK; 1543/6309, 6 km by road W of Ascención, 1 AM; 1557/6442, Ichilo (Hershkovitz, 1962); 1623/6059, San Ignacio de Velasco, 35 US; 1635/6225, San Ramón, Castedo, 4 MNK; 1635/6412, Punta Rieles, 2 AM, 2 CENETROP; 1636/6242, 10 km N of San Ramón, 4 AM, 3 MSB; 1647/6314, Estancia Cachuela Esperanza, 22 AM, 7 MSB; 1649/6237, Palmarito, río San Julián, 5 BM, 1 CM; 1700/6355, Ayacucho, 18 AM, 1 CENETROP, 1 MNK; 1703/6335, 7 km N of Santa Rosa, 13 AM; 1708/6349, near

Buen Retiro, province of Ichilo, 1 FM; 1713/6338, 6 km N of Buen Retiro, 17 AM; 1722/6325, río Surutú, province of Sara, 1 CM; 1723/6314, 3 km SE Montero, 1 km N of Villa Copacabana, 6 AM, 4 MNK, 10 MSB; 1723/6332, San Miguel Rincón, 5 AM, 1 MSB; 1724/6345, San Carlos, province of Ichilo, 1 FM; 1724/6351, río Surutú, 1 CM; 1727/6340, Buenavista, 3 BM; 3 FM, 1 UMMZ, 1 MACN (not examined); 1727/6340, Ichilo [province], 2 MACN (not examined); 1730/6310, Juan Latimo area, 3 US; 1730/6310, Warnes, 12 US; 1733/6244, 8 km N and 1 km E of Pailón, 46 MNK; 1734/6245, 7 km N of Pailón, 8 MNK; 1736/6336, San Rafael de Amboró, 19 AM, 11 MSB; 1739/6245, 3.5 km W of Estación Pailón, 11 AM, 1 MSB; 1739/6245, 0.5 km E of Pailón, 1 MNK; 1739/6348, hunting camp at 4 km S, 13 km W San Rafael de Amboró, 1 AM; coordinates uncertain, Sonprerito, 1 MNK; 1741/6322, Terebinto, 1 MNK; 1741/6323, 2 km W of Terebinto, 5 MNK; 1744/6245, 7 km S of Pailón, 2 MNK; 1744/6328, 4 km SW of Estancia San Pedro, 4 AM, 2 MNK, 3 MSB; 1745/6257, Cotoca, 1 AM, plus other owl pellet material in La Paz; 1747/6322, 2 km SW of Las Cruces, 11 AM, 11 MNK, 6 MSB; 1747/6322, 3 km SW Las Cruces, 13 AM, 11 MNK, 6 MSB; 1748/6310, Santa Cruz de la Sierra, 1 AM, 1 CM, 4 MACN (not examined), + 6 from owl pellets in La Paz; 1751/6320, Ayacucho, province of Ibáñes, 11 US; 1752/6031, 4 km S and 24 km E of San Jose de Chiquitos, 4 AM; 1753/6307, 15 km S of Santa Cruz, 7 MSB; 1758/6303, 27 km SE of Santa Cruz, 5 AM, 2 MNK, 14 MSB; 1807/6313, 2 km W of Basilio, 1 MNK; 1808/6312, 7 km E and 3 km N of Ingeniero Mora, 35 AM; 1808/6319, Basilio, 30 MNK; 1809/6312, Los Tajibos, 2 km N and 7 km E Ingeniero Mora, 1 MSU; 1816/6311, 3 km N of Zanja Honda, Hacienda El Pelícano, 26 AM, 4 MNK, 11 MSB; 1818/5936, 4 km N and 1 km W of Santiago de Chiquitos, 7 AM; 1825/6210, Tita, 7 AM, 1 MNLP; 1828/6207, 8 km SE of Tita, 42 AM, 6 MSB, 8 MNLP; 1845/6406, La Hoyada, 30 km S Vallegrande, 2 MVZ; 1846/6214, Curuyuqui, 1 US; 1857/5751, Puerto Suárez, 1 CM; 1913/6336, 1 km S and 3 km W of Estancia Isibobo, 1 AM; 1927/6221, Cerro Colorado, 31 EBD; 1948/6331, Cerro Itahuaticua, 9 AM, 7 MNK, 5 MSB; 1955/6334, 17 km N Caimiri, 3 AM; 2001/6313, San Antonio, Parapeti, 6 BM; 2005/6334, Camiri, province of Cordillera, 6 CAS, 1 US; 2005/6334, Camiri and Choreti regions, Chaco frontier, 2 US; 2026/6302, 26 km E of Boyuibe, 1 AM; 2027/6250, 53 km E of Boyuibe, 3 AM, 2 MNK; coordinates uncertain, La Forestal, Colonia San Pedrito, 1 MNK; coordinates uncertain, Huandá, province Andréz Ibáñes, 1 MNK; coordinates uncertain, probably Santa Cruz, 1 MNK; coordinates uncertain, Lira, province Andréz Ibáñes, 1 MNK. **Tarija:** 2100/6323, 1 km S of Camatindi, 2 AM, 2 MSB; 2115/6330, San Francisco on río Pilcomayo, 6 BM (Thomas, 1898); 2115/6330, Villa Montes, 1 ZFMK (Hershkovitz, 1962); 2119/6325, 8 km S and 10 km E of Villa Montes, 22 AM; 2138/6234, Estancia Bolívar, 8 AM, 6 CBF, 9 MSB; 2138/6237, 5 km W of Estancia Bolívar, 6 AM, 2 CBF, 4 MSB; 2149/6334, Caiza, 1 BM.

Measurements in tables 15 and 17 are of specimens from Laguna Palmar (6 M, 8 F) and Tarija (AM 7).

Calomys laucha (Olfers *in* Eschwege), 1814

Laucha Chica

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Mus laucha* was described by Olfers (*in* Eschwege, 1814: 209), type locality restricted by Hershkovitz, 1962: 153, to vicinity of Asunción, Paraguay.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: *Calomys laucha* differs from other species of *Calomys* as noted in the accounts of those species. It is the smallest species and pale buff or whitish postauricular patches are usually more conspicuous than in other *Calomys*. Upper parts are buff to tawny mixed with black and an ochraceous lateral line may be present (Hershkovitz, 1962: 143). Measurements in tables 18 and 20 are of specimens from 2119/6325 (AM 246666–246668, 246672–246675, 246849, 246867, 246883).

DISTRIBUTIONAL NOTES: Chacoan lowland and up to 2400 m (Carlazo) in the foothills. Known localities are listed below and mapped in figure 736.

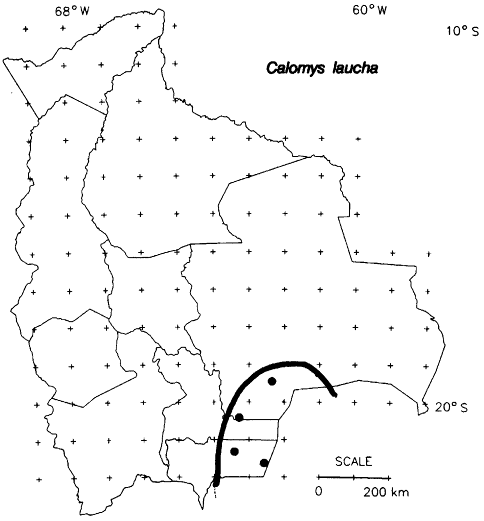


Fig. 736. Localities of known occurrence of *Calomys laucha*.

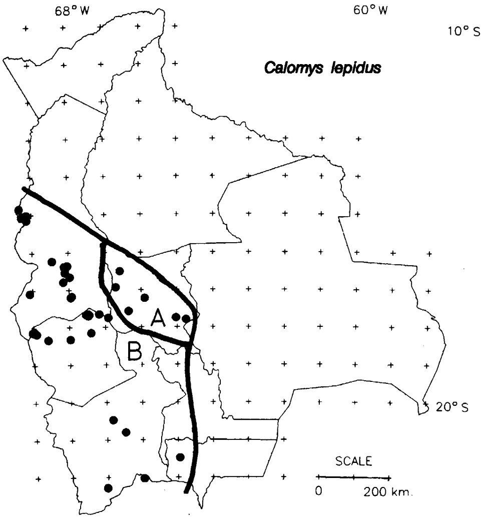


Fig. 737. Localities of known occurrence of two subspecies of *Calomys lepidus*, *C. l. carillus* (A) and *C. l. ducillus* (B).

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

The only scientific name used for Bolivian specimens is:

Calomys laucha: Anderson, 1993: 39 (three localities in Tarija). Steppan, 1995: 104 (10 km E of Villa Montes).

LOCALITIES (4) AND SPECIMENS (21): **Santa Cruz:** 1927/6221, Cerro Colorado, 1 EBD; 2025/6317, Boyube (= Boyuibe), near Camiri, 1 CAL. **Tarija:** 2119/6325, 8 km S and 10 km E of Villa Montes, 13 AM; 2138/6234, Estancia Bolívar, 2 AM, 2 CBF, 2 MSB.

Calomys lepidus (Thomas), 1884

Andean Vesper Mouse, Laucha Andina

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Hesperomys* (*Calomys*) *bimaculatus lepidus* was described by Thomas (1884: 454), type locality Junín, Peru. *Eligmodontia ducilla* was described by Thomas (1901a: 182), type locality San Antonio, department of Puno, Peru. Cabrera (1961a: 480) first used the name combination *Calomys lepidus ducillus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: *Calomys lepidus* differs from *C. callosus* as noted in the account of that species. From *C. sorellus* and *C. laucha*, *C. lepidus* differs in having the posterior tip of the lower incisor indicated as a ridge without capsular projection (Hershkovitz, 1962: 137). The tail of *C. lepidus* is whitish or pale gray rather than brownish above and paler beneath, and there is more hair on the palm near the heel, partially hiding the tarsal tubercle from view.

DISTRIBUTIONAL NOTES: Occurs in the highlands at elevations from 2950 m (17 km E of Totora) up to 4820 m (Laguna Kellhuani). Known localities are listed below and mapped in figure 737.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: One pregnant female with six embryos was recorded in March for *C. l. ducillus*.

Scientific synonyms used for Bolivian specimens are given under subspecies below.

Calomys lepidus carillus (Thomas), 1902

Eligmodontia carilla Thomas, 1902a: 133 (type locality Choro, upper río Sécure, department of Cochabamba, Bolivia). Neveu-Lemaire and Grandidier, 1911: 11 (Choro).

Hesperomys carillus carillus: Thomas, 1919c:

130 (by implication, named new subspecies in Argentina). Gyldenstolpe, 1932: 74.

Calomys lepidus carillus: Hershkovitz, 1962: 158 (Choro). Anderson, 1985b: 13 (name in list). Anderson, 1993: 39 (general distributional records).

LOCALITIES (6) AND SPECIMENS (13): **Cochabamba:** 1630/6635, Ayopayo, 1 FM; 1656/6642, Choro, 1 BM, 1 FM; 1713/6554, 13 km N of Colomi, 2 AM, 3 CBF, 1 MSB; 1714/6557, 16.5 km NW of Colomi, 1 AM; 1734/6621, Parotani, 1 AM; 1745/6502, 17 km E of Totora, Tinkusiri, 2 MSB.

Measurements in table 18 are of two specimens from 13 km N of Colomi (AM 268863, MSB 70536).

Calomys lepidus ducillus (Thomas), 1901

Hesperomys lepidus montanus Sanborn, 1950: 4 (type locality La Cumbre, department of La Paz, Bolivia).

Calomys lepidus ducillus: Anderson, 1993: 39 (general distributional records). Yensen and Tarifa, 1993: 55 (14 from three localities near Sajama and 10 from owl pellets).

Calomys lepidus carillus: Hershkovitz, 1962: 158 (La Cumbre).

Calomys lepidus: Yoneda, 1984b: 12 (Collana); 1984c: 56 (Ulla Ulla). Serrano and Anderson, 1986: 182 (río Suches). Salazar, 1990: 193 (Laguna Colorada, Pozo Sol de Mañana, and Campamento Khastor). Mercado and Miralles, 1991: 295 (La Paz valley). Steppan, 1995: 105 (Ulla Ulla).

LOCALITIES (38) AND SPECIMENS (235): **La Paz:** 1450/6920, río Suches, 68 (Serrano and Anderson, 1986); 1500/6908, Lago Puyu Puyu, 1 MNLP; 1502/6913, Ulla Ulla [5 km E of], 1 IE, 2 MNLP; 1503/6916, Ulla Ulla, 1 UMMZ [121081]; 1508/6908, Lago Llachokota, 4 MNLP; 1613/6827, Chililya, Lake Titicaca, 1 AM; 1621/6802, Hacha Toloko, 1 CBF; 1622/6803, La Cumbre, 4 AM; 1621/6803, 2 km E of Estancia Alto Achachicola, 1 IE; 1622/6807, Laguna Kellhuani, 1 IE; 1632/6806, Calacoto, 1 MNLP; 1639/6758, Collana, 5 MNLP; 1647/6809, 20 mi [= 32 km] S La Paz, 1 MVZ; 1705/6905, 13 km W of San Andrés de Machaca, 1 MSB; 1710/6755, Huaraco, 44 IE (8 not seen), 1 MNLP; 1712/6757, Viscachani, 1 AM; 1727/6737, Huaraco-Antipampa, 12 from owl pellets (Peñaranda). **Oruro:** 1739/6710, Caracollo, 2 IE; 1739/6728, 2.5 km NE of Huancaroma, 2 MSB; 1740/6727, 3.5 km E of Huancaroma, 18 AM; 1740/6727, Huancaroma, 2 AM, 1 MSB; 1740/6728, 2 km E of Huancaroma, 1 AM; 1740/6730, 1 km W of Huancaroma, 2 MSB; 1740/6732, 3 km W of Huancaroma, río Desaguadero, 2 AM, 1 MSB; 1742/6728, 1 km E and 3 km S of Huancaroma, 3 MSB; 1745/6655, 20 mi [= 32 km] NE Oruro, 1 MVZ; 1808/6902, 5 km from Pueblo Sajama, 3 CBF; 1808/6858, 1 km SE of Sajama, 7 CBF; 1808/6859, 1.5 km SW of Sajama, 4 CBF; 1809/6724, 37 km SW of Oruro, 3.5 km NE of Toledo, 1 AM; 1810/6855, 6 km NE of Lagunas, 3 AM; 1819/6759, 5 km W and 1 km N of Pomata Ayte, río Barros, 1 AM; 1820/6836, Estancia Agua Rica, 40 km E and 22 km S of Sajama, 3 AM, 1 MSB. **Potosí:** 1931/6651, río Sevaruyo, 4 from owl pellets (Peñaranda); 2028/6650, Uyuni, 1 ANSP; 2048/6629, Cerdas, 2 ANSP; 2202/6558, 5 mi [= 8 km] N Villazon, 1 MVZ; 2217/6701, Khastor, 6 MNLP. **Tarija:** 2129/6457, 1 km E of Iscayachi, río Tomayapo, 10 AM; 2 MSB.

Measurements in tables 18 and 20 are of specimens from four localities near Huancaroma (AM 262786–262788, 260607–260624, 260626) and from 1 km E of Iscayachi (AM 262791–262796).

Calomys musculinus (Thomas, 1913)

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Eligmodontia laucha musculina* was described by Thomas (1913a: 138), type locality "Maimara. 2230 m." in the province of Jujuy, Argentina. Cabrera (1961a: 479) used the name combination *Calomys laucha musculinus*. *Hesperomys murillus cordovensis* was described by Thomas (1916b: 184), type locality Yacanto, Córdoba, Argentina.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from 1727/6507 (MVZ 119955), 2137/6540 (MVZ 119956), 1748/6445 (AM 246798), 1751/6437 (AM 260670), 1755/6434 (AM 260666), and 2137/6540 (MVZ 119956).

DISTRIBUTIONAL NOTES: Ranges from elevation 1500 m (Tapecua) to 4000 m (Sama).

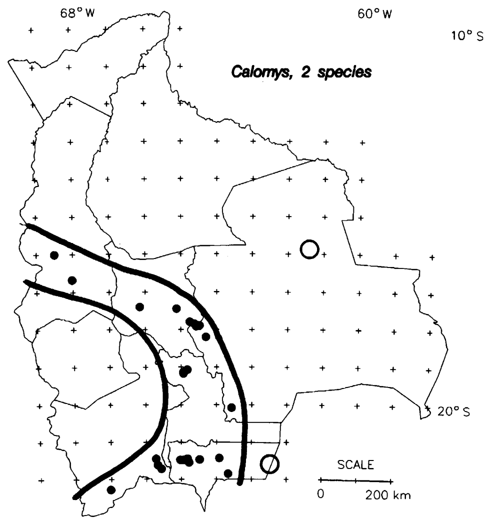


Fig. 738. Localities of known occurrence of two species of *Calomys*, *C. musculinus* (dots) and *C. tener* (circles).

Known localities are listed below and mapped in figure 738.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: Three females with no embryos were recorded in July; no other data.

Scientific synonyms used for Bolivian specimens are:

Oryzomys laucha: Thomas, 1898b: 3 (Aguairenda Mission).
Hesperomys murillus cordovensis: Thomas, 1926a: 322 (Tablada, Sama).
Hesperomys musculinus: Thomas, 1926d: 194 (Tupiza).
Calomys laucha laucha: Hershkovitz, 1962: 149 (Sama, Tablada).
Calomys laucha musculinus: Anderson, 1985b: 13 (name in list).
Calomys musculinus: Anderson, 1993: 39 (general distributional records). Ibáñez et al., 1994: 82 (first specimen from La Paz).

Localities (26) and Specimens (99): **Chuquisaca:** 1904/6449, 12 km N and 11 km E of Tarabuco, 1 AM; 1908/6456, 4 km N of Tarabuco, 1 AM, 1 MSB; 1909/6456, 3 km N of Tarabuco, 1 AM; 1910/6456, 2 km N of Tarabuco, 1 AM, 2 MNLP, 1 MSB. **Cochabamba:** 1724/6609, Cochabamba, 1 AM, plus 37 others from owl pellets in collection in La Paz; 1727/6507, 10 mi [= 16 km] NE Punata, 1 MVZ; 1748/6445, 101 km by road SE of Epizana, Siberia Cloud Forest, 1 AM. **La Paz:** 1600/6830, Titicaca (coordinates uncertain), 10 from owl pellets in La Paz; 1640/6801, Mecapaca, 1 EBD. **Potosí:** 2127/6543, Tupiza, 6 BM; 2137/6540, 20 mi [= 32 km] SSE Tupiza, 1 MVZ; 2143/6534, Yuruma, 20 km SSE of Tupiza, 1 MVZ; 2217/6701, Khastor, 1 MNLP. **Santa Cruz:** 1751/6437, 21 km by road W of Comarapa, 1 AM; 1754/6429, Comarapa, 1 BM; 1755/6434, 1 km N and 8 km W of Comarapa, 4 AM, 2 MSB; 1812/6418, 17 km S of Quine (Estancia Laja), 1 MNK; 2005/6334, near Camiri, 1 CAS. **Tarija:** 2126/6355, Tapecua, 1 AM, 1 CBF; 2127/6449, 1 km E of Tucumilla, 3 AM, 4 CBF, 3 MSB; 2128/6429, 38 km by road ENE of Tarija, Carlazo, 1 UMMZ; 2129/6455, 4.5 km E of Iscayachi, 1 AM, 1 MSB; 2129/6457, 1 km E of Iscayachi, río Tomayapo, 3 AM; 2129/6502, Sama, 1 BM; 2133/6447, Tablada, 1 BM; 2151/6340, Aguairenda Mission, 1 BM (Thomas, 1898b).

Calomys tener (Winge, 1888)

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Hesperomys tener* was described by Winge (1888: 15), type locality Rio das Velhas, Lagoa Santa, Minas Geraes, eastern Brazil. Cabrera (1961a: 481) used the name combination *Calomys tener*. Jorge Salazar (personal commun.) recognized that the specimen (MSB 63396) agreed with the key characters for *C. tener* in the revision by Olds (1988). The large series of *Calomys* from Beni and Santa Cruz should be studied again to see if other specimens of *C. tener* have been misidentified as *C. callosus*. Additional characters, including chromosomes, should be studied to test further the specific distinction of *C. tener* and *C. callosus*.

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of MSB 63396.

Distributional Notes: Specimens from two localities at about 300 m elevation have been tentatively identified as *C. tener*. The localities are noted below and mapped in figure 738.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

LOCALITIES (3) AND SPECIMENS (3): **Santa Cruz:** 1550/6127, Santa Rosa de la Roca, 1 MSB 63396. **Tarija:** 2138/6234, Estancia Bolívar, 1 MSB (67207, tentative identification); 2148/6347, 3 km WNW of Carapari, 1 MSB (67219, tentative identification).

Calomys venustus Thomas, 1894

TAXONOMIC REMARKS: One name used for Bolivian specimens has its type locality outside of Bolivia. *Hesperomys venustus venustus* was described by Thomas (1894b: 359), type locality Cosquin, Córdova Province, Argentina. Olds (1988) treated *C. venustus* as a separate species from *C. callosus*. Their ranges, as she defined them and as shown here for Bolivia, are allopatric. Clear sympatry of two forms would support the hypothesis of separate species; however, at no place has sympatry been indicated. No local population sample has been described that is large enough to provide adequate statistical confidence and that is clearly intermediate in size and other characters. Such a sample would support the hypothesis of intergradation and conspecificity. However, the hypothesis that the two may intergrade and thus be better treated as subspecies has not been rejected. They differ in average size, *venustus* being larger but overlapping in measurements. Furthermore, Olds indicated that no character provides any more consistent separation than does size. Additional specimens and further morphological study and study of karyology and genetic characters observable by electrophoretic patterns or other newer biochemical methods should help to resolve this uncertainty.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of an adult specimen from Chijchipani (AM 262780) and specimens from río Limón (AM 263772), Tomina (US 271404–271405), Tihumayu (US 290912–290914, 290917), and Rosal (US 290918, 290904).

DISTRIBUTIONAL NOTES: Generally distributed in the valleys west of the range of *C. callosus*. Ranges from elevation 600 m (Yacuiba) to 2750 m (Arani). Known localities are listed below and mapped in figure 739.

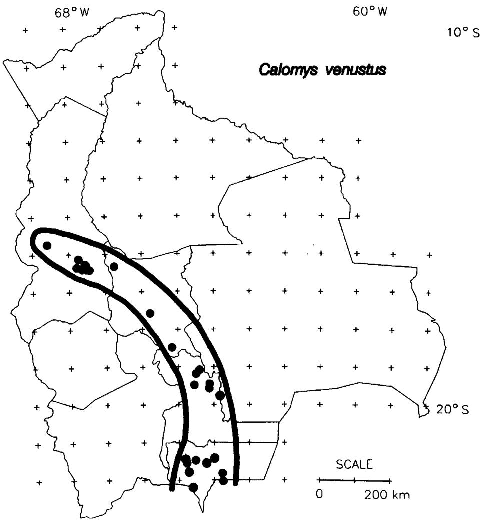


Fig. 739. Localities of known occurrence of *Calomys venustus*.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Eligmodontia callosa boliviae Thomas, 1901f: 253 (type locality río Solocame, department of La Paz, Bolivia). Neveu-Lemaire and Grandidier, 1911: 10 (río Solocame, Yungas, Astillero).

Hesperomys callosus boliviae: Thomas, 1916a: 141. Tate, 1932a: 18. Sanborn, 1950: 3.

Hesperomys venustus: Thomas, 1925: 578 (Caraparí, Yacuiba).

Hesperomys fecundus Thomas, 1926b: 321 (type locality "Tablada, 2000 m." in the department of Tarija, Bolivia; and specimens from Carlazo). Gyldenstolpe, 1932: 76.

Calomys callosus boliviae: Cabrera, 1961a: 477. Anderson, 1985b: 13 (name in list).

Calomys venustus venustus: Cabrera, 1961a: 481 (extreme south of Bolivia; Tablada by inference).

Calomys callosus callosus: Hershkovitz, 1962: 166, 171 (Pitiguaya, Astilleros, río Solacamo, Tablada, Caraparí, Yacuiba).

Calomys callosus callosus: Hershkovitz, 1962: 172 (Tablada).

Calomys fecundus: Corbet and Hill, 1991: 160 (name in list, as from "Bolivia"). Braun, 1993: 47 (11 from Bolivia, including specimens from Tomina, Llantocsillas, and Tola Orka).

Calomys venustus: Patterson, 1992: 28 (Chulumani, Laza; photo of skull). Anderson, 1993: 39 (general distributional records).

Calomys boliviae: Musser and Carleton *in* Wilson and Reeder, 1993: 696.

Localities (30) and Specimens (160): **Chuquisaca:** 1905/6424, Llantocsillos, province of Tomina, 3 US; 1911/6430, Tomina, province of Tomina, 3 US; 1927/6407, Tola Orko, 40 km from Padilla, 4 US; 1929/6433, Horcus, 80 km SE Sucre, 7 MVZ; 1933/6408, Río Limón, 2 CBF, 2 MSB; 1934/6408, Tihumayo, province of Tihumayu, 2 US; 1934/6408, Tihumayu, province of Tomina, 6 US; 1943/6351, 2 km E of Chuhuayaco, 1 MNLP; coordinates uncertain, Rosal, province of Tomina, 1 US. **Cochabamba:** 1620/6645, Yungas, 1 BM; 1734/6546, Arani, 1 BM; 1829/6510, 2 km NW of Peña Blanca, 1 AM. **La Paz:** 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 2 TTU; 1544/6835, Huancuni, 1 Stockholm; 1608/6744, Chijchipani, 3 AM; 1616/6733, Astillero, 1 BM; 1618/6732, río Solocame, 3 BM; 1621/6747, Pitiguaya, 3 AM; 1624/6731, Chulumani, 22 (Patterson, 1992: 28); 1624/6738, Tarila, 1 IE; 1625/6726, Lasa, 1 (Patterson, 1992: 28). **Tarija:** 2122/6358, 18 km W of Palos Blancos (by road), 1 AM; 2127/6449, 1 km E of Tucumilla, 6 AM, 3 CBF, 4 MSB; 2128/6432, Carlazo, 1 BM; 2132/6412, Entre Ríos, province of Oconnor, 6 US; 2133/6447, Tablada, 11 BM; 2147/6440, 11.5 km N and 5.5 km E of Padcaya, 3 AM, 1 CBF, 1 MSB; 2148/6347, 3 km WNW of Caraparí, 14 AM, 19 CBF, 9 MSB; 2149/6346, Caraparí, 6 BM; 2202/6345, Yacuiba, 3 BM.

Calomys, species not determined

The following specimens have not been assigned to species.

Localities (12) and Specimens (191): **Chuquisaca:** 1904/6449, 12 km N and 11 km E of Tarabuco, 1 AM; 1918/6422, 9 km by road N of Padilla, 1 AM, 1 MNLP; 1933/6408, Río Limón, 1300 m elevation, 20 AM, 13 MNLP, 7 MSB; 1949/6358, 2 km SW of Monteagudo, 22 AM, 17 MNLP, 15 MSB. **La Paz:** 1502/6913, Ulla Ulla, 1 EBD (not seen). **Santa Cruz:** 1740/6327, Wendá Patriota, Andrés Ibáñes province, 3 MNK; 1818/6312, Zanja Honda, 54 MNK; coordinates uncertain, La Forestal, Andrés Ibáñes province, 4 MNK; coordinates uncertain, Andrés Ibáñes province, 1 MNK. **Tarija:** 2128/6448, Erquis, 2 AM, 1 MSB; 2126/6355, Tapecua, 1 MSB (67349); 2129/6412, 5 km NNW of Entre Ríos, 2 AM, 1 MSB. **Department unknown:** coordinates uncertain, "Bolivia" only, 2 AM, 1 BM.

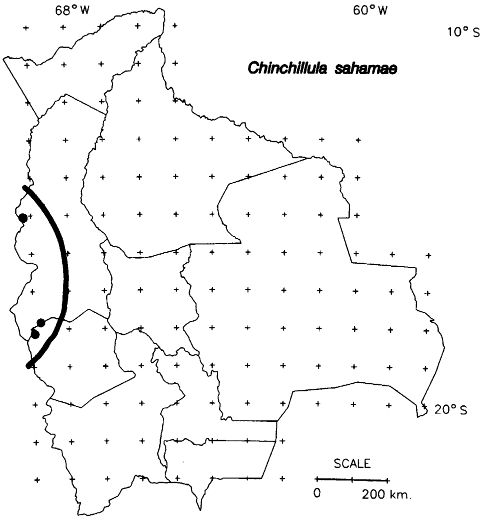


Fig. 740. Localities of known occurrence of *Chinchillula sahamae*.

Genus *Chinchillula* Thomas, 1898

Chinchillula sahamae Thomas, 1898

Chinchilla Rat, Achallo

Taxonomic Remarks: *Chinchillula* is in a monophyletic clade with *Galenomys* and *Auliscomys*, in the analysis of Steppan (1993: 195). Mann (1945) suggested that the Chilean population (represented by one specimen) might prove to be subspecifically different from Bolivian populations. Pine et al. (1979: 357) commented on individual variation in tail color. A critical review of larger series is needed to get a satisfactory picture of geographic variation.

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from/near Ulla Ulla, (AM 249018–249020, 247885–247886).

Distributional Notes: All localities are above 4000 m elevation. Known localities are listed below and mapped in figure 740.

HABITAT: Have been captured near stone walls.

No Bolivian data are available on habits, behavior, food, or reproduction.

Scientific synonym used for Bolivian specimens is:

Chinchillula sahamae Thomas, 1898a: 280 (type locality Esperanza, department of La Paz, Bolivia). Neveu-Lemaire and Grandidier, 1911: 12 (Esperanza). Gyldenstolpe, 1932: 100 (Esperanza). Tate, 1932a: 16. Cabrera, 1961a: 497 (Esperanza). Hershkovitz, 1962: 485 (Esperanza). Pine et al., 1979: 357 (discussed the comparison of Chilean and Bolivian specimens made by Mann, 1945). Yoneda, 1984c: 56 (Ulla Ulla). Anderson, 1985b: 13 (name in list). Suárez Morales, 1986: 55 (name in list). Olds and Anderson, 1990: 72 (5 km E Ulla Ulla). Voss, 1991: 112 (presence of gall bladder in two specimens from near Ulla Ulla). Anderson, 1993: 40 (general distributional records). Yensen and Tarifa, 1993: 57 (Quebrada Kohuiri). Yensen et al., 1994: 408 (1808/6857).

LOCALITIES (6) AND SPECIMENS (15): **La Paz:** 1502/6913, 5 km E Ulla Ulla, 4 AM; 1502/6913, La Cabaña, 1 CBF; 1502/6913, Estación Ulla Ulla, 4 IE, 1 MNLP, 2 MVZ; 1503/6912, 7 km E Ulla Ulla, 1 AM; 1749/6847, Esperanza, 1 BM. **Oruro:** 1808/6857, Quebrada Kohuiri, 1 CBF.

Genus *Eligmodontia* Cuvier, 1837

TAXONOMIC REMARKS: This genus has been tentatively allied with *Andalgalomys* and *Graomys* in an "*Eligmodontia* group" (Steppan, 1993: 203). Other authors have allied *Eligmodontia* with *Calomys* (Olds, 1988). Braun (1993: 19) in her morphologically based cladogram placed *Eligmodontia* as the next branch of the phyllotine lineage after the basal branching of *Calomys* and before the further radiation of other genera. The question of phylogenetic relationships remains open.

Eligmodontia puerulus (Philippi), 1896

Andean Gerbil Mouse, Laucha Colilarga

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Eligmodontia typus* was described by F. Cuvier (1837: 169), type locality Corrientes, Argentina. *Hesperomys puerulus* was described by Philippi (1896: 20), type locality San Pedro de Antofagasta, province of Antofagasta, Chile.

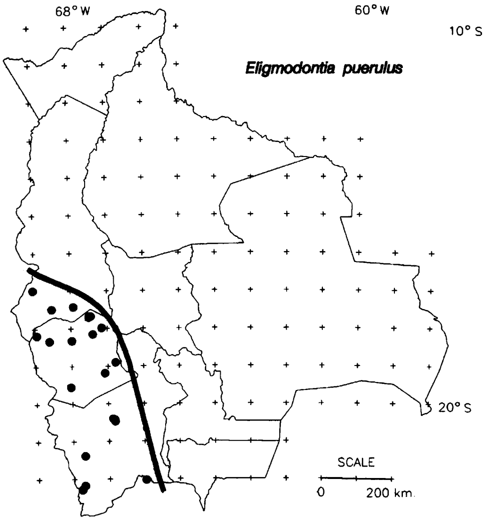


Fig. 741. Localities of known occurrence of *Eligmodontia puerulus*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 (Olds et al., 1987) are from Oruro (BM 1902.2.2.39 to 42) and río Barros (AM 262805–262808).

DISTRIBUTIONAL NOTES: Widely distributed at elevations above 3000 m. Known localities are listed below and mapped in figure 741.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: One female in May had four embryos.

Scientific synonyms used for Bolivian specimens are:

Phyllotis hirtipes Thomas, 1902b: 225 (type locality Challapata, department of Oruro, Bolivia). Neveu-Lemaire and Grandidier, 1911: 11 (Challapata, Oruro, Pampa Aullaga).

Eligmodontia hirtipes hirtipes: Gyldenstolpe, 1932: 71 (Challapata). Tate, 1932a: 17.

Eligmodontia typus puerulus: Hershkovitz, 1962: 175 (Challapata, Oruro, Pampa Aullaga). Anderson, 1985b: 13 (name in list).

Eligmodontia puerulus: Ortells et al., 1989: 137 (by inference and from tentative assignment of specimens from nearby in Peru; no Bolivian material studied). Kelt et al., 1991: 353 (karyotypes from five Bolivian localities). Anderson,

1993: 39 (general distributional records). Yensen and Tarifa, 1993: 56 (3 km E of Lagunas).
Eligmodontia typus: Salazar Bravo, 1990: 193 (north rim of Laguna Colorada).
Eligmodontia hirtipes: Braun, 1993: 47 (Oruro, Challapata, Pampa Ollaga).

Localities (24) and Specimens (77): **La Paz:** 1659/6902, 8.5 km W of San Andrés de Machaca, 1 MSB; 1725/6755, San José Llangua, 8 CBF; 1729/6831, near Ulloma, 0.5 km S of río Desaguadero, 2 CBF. **Oruro:** 1740/6727, 3.5 km E of Huancaroma, 1 MSB; 1740/6729, Huancaroma, 1 AM; 1740/6730, 1 km W of Huancaroma, 1 AM; 1742/6730, 12 km S and 1.6 km E Eucaliptus, Lecheria Huancaroma, 2 AM; 1759/6709, Oruro, 4 BM; 1809/6724, 37 km SW of Oruro, 3.5 km NE of Toledo, 3 AM, 3 MSB; 1811/6857, 3 km E of Lagunas, 1 CBF; 1819/6759, 5 km W and 1 km N of Pomata Ayte, río Barros, 4 AM, 2 MSB; 1820/6836, Estancia Agua Rica, 40 km E and 22 km S of Sajama, 4 AM, 1 MSB; 1854/6647, Challapata, 3 BM; 1911/6705, Pampa Aullaga, 1 BM; 1933/6802, Tauca, 3 IE; 1934/6723, Puqui, 1 IE. **Potosí:** 1931/6651, río Sevaruyo, 2 from owl pellets (Peñaranda); 2024/6653, Entre Colchani y Uyuni, 1 EBD; 2025/6650, 5 km N of Uyuni, 13 EBD; 2028/6649, 1 mi [= 1.6 km] E Uyuni, 3 MVZ; 2123/6741, 2 km N of Villa Alota, 4 EBD; 2202/6558, 5 mi [= 8 km] N Villazon, 1 MVZ; 2210/6742, 2 km E of ENDE camp, Laguna Colorada, 2 AM, 1 MSB; 2217/6747, Laguna Colorada, 4 EBD.

Genus *Galenomys* Thomas, 1916

Galenomys garleppii (Thomas), 1898

Taxonomic Remarks: *Galenomys* is a member of an "*Auliscomys* group" along with *Chinchillula* and *Auliscomys* (Steppan, 1993: 202; see notes under *Auliscomys*).

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from 1741/6731 (AM 246945–246947) and 1740/6729 (AM 242814).

Distributional Notes: Known from only four localities, all above 3000 m elevation. These localities are listed below and mapped in figure 742.

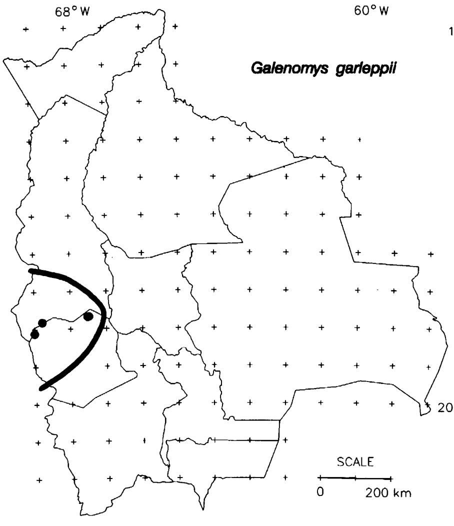


Fig. 742. Localities of known occurrence of *Galenomys garleppii*.

No Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: One female in December had four embryos. Four young were taken in December.

Scientific synonyms used for Bolivian specimens are:

Phyllotis (?) *Garleppii* Thomas, 1898a: 279 (type locality Esperanza, northeast of Mount Sahama, in department of La Paz, Bolivia).
Phyllotis Garleppi: Neveu-Lemaire and Grandidier, 1911: 11 (vicinity of Mount Sahama).
Euneomys (*Galenomys*) *garleppi*: Thomas, 1916a: 143 (Esperanza). Tate, 1932a: 16 (Esperanza).
Galenomys garleppii: Gyldenstope, 1932: 96 (Esperanza). Anderson, 1985b: 13 (name in list). Anderson, 1993: 40 (general distributional records). Yensen and Tarifa, 1993: 57 (mention Sajama and the type locality).
Galenomys garleppi: Hershkovitz, 1962: 468 (Esperanza). Braun, 1993: 48 (Esperanza). Steppan, 1995: 106 (Esperanza).
Phyllotis garleppi: Corbet and Hill, 1991: 161 (name in list).

Localities (4) and Specimens (12): **La Paz:** 1749/6847, Esperanza, 1 BM, 1 FM. **Oruro:** 1740/6729, Huancaroma, 1 AM; 1741/6731, 11.2 km S and 0.8 km W Eucaliptus, 7 AM; 1807/6900, Sahama, 1 BM. **Department unknown:** "Bolivia" only, 1 FM.

Genus *Graomys* Thomas, 1916a

TAXONOMIC REMARKS: The genus *Graomys* currently includes four species, three of which live in Bolivia. The taxonomic history of these species in Bolivia is reflected in the synonymies below. Since Thomas named the genus in 1916, it has been treated as a subgenus by Osgood (1916), as a single species within *Phyllotis* by Hershkovitz (1962), and again as a distinct genus with at least two species by Pearson and Patton (1976). The genus *Graomys* may be paraphyletic; further work is needed to resolve the question (Steppan, 1993: 203).

Graomys domorum (Thomas), 1902

Pericote Palido

TAXONOMIC REMARKS: Among the interesting and unanswered taxonomic questions relating to *Graomys domorum taterona* is whether it is subspecifically distinguishable from *G. domorum domorum*, and, if so, how? More specimens from southern Bolivia are needed to answer this. Is it, in fact, conspecific with *G. domorum* (chromosomes may need to be studied here)? I have not examined the holotype and perhaps Cabrera did not. Thomas's description, based on one specimen, seems to agree with *G. domorum* rather more than with *G. griseoflavus*, including slaty bases of ventral hairs, dorsal and ventral colors on sides and on tail not sharply demarked, black on ear, and less hair on tail.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: *Graomys domorum* has been said to differ from *G. griseoflavus* in larger size (Mares et al., 1981b), smaller bullae, white venter with hairs basally gray (rather than pure white), and less hairy tail (Thomas, 1902a: 133). The report of larger size was documented by measurements of two large specimens assigned to *G. domorum*. More adequate samples need to be measured to test this hypothesis. Even if significant average differences are eventually detected, size is of no use in identifying specimens because of the great overlap of sizes seen in the series that I have examined. Furthermore, the two largest skulls of *Graomys* at the American Museum of Natural History are of *G. griseoflavus* (185222 from Jujuy and 248438 from Paraguay) rather than of *G. domorum*.

Both species have a relatively sharp change from dorsal brown to ventral white pelage on both body and tail, but this seems more striking in *G. griseoflavus* because of its pure white ventral hairs. Both species have a blackish area on the outside anterior part of each ear, but this contrasts more with the less blackish color of the inside of the ear in *G. domorum* than in *G. griseoflavus*.

A comparison by the "method of pairs" (Anderson, 1956), using eight specimens of Bolivian *G. domorum* matched by size and tooth wear with eight of *G. griseoflavus*, reveals or verifies that *G. domorum* differs in having incisive foramina that are longer (6 of 8) and wider (8 of 8), bullae that are smaller (6 of 8, the other two being indistinguishable in size), a more conspicuous medial projection on the posterior margin of the palate (7 of 8), and M3 teeth that are, relative to the size of M2, smaller. Comparisons of the shape of the posterior margin of the frontal bones, the antero-posterior dimension of the interparietal, the distinctness of the supraorbital angularity, the breadth of nasals, the breadth of upper incisors, the mesopterygoid breadth, and some other features revealed no noteworthy differences.

The chromosomes differ markedly in numbers and form in *G. domorum* ($2n = 28$) and *G. griseoflavus* ($2n = 36$–38; Pearson and Patton, 1976: 341).

DISTRIBUTIONAL NOTES: Occurs at elevations of from 600 m (San Antonio) to 3700 m (Cabrada). Known localities are listed below and mapped in figure 743.

HABITAT: *Graomys domorum* is said to inhabit transitional forest on low mountains and *G. griseoflavus* to inhabit drier middle and lower areas in Argentina, just to the south of Bolivia in Salta Province, (Mares et al., 1981b). They reported no location of sympatry, although the two species were recorded only 10 km apart near a place named Anta. The limited data for Bolivia fit this elevational and habitat pattern but no local area of sympatry or nearby localities of occurrence are known yet.

HABITS AND BEHAVIOR: No detailed Bolivian data are available.

PARASITOLOGY: Fonseca (1960: 94) report-

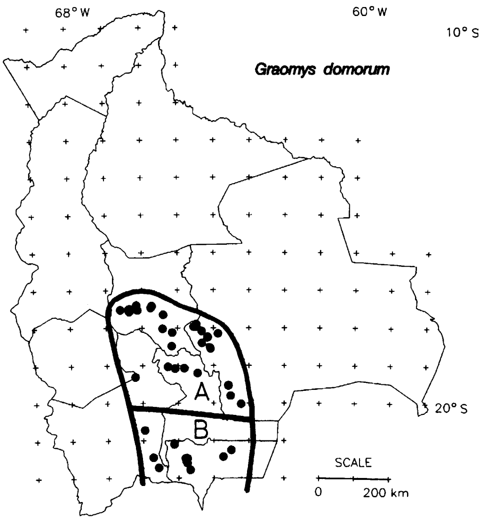


Fig. 743. Localities of known occurrence of two subspecies of *Graomys domorum*, *G. d. domorum* (A) and *G. d. taterona* (B).

ed a tick (Laelaptidae, *Cavilaelaps bresslaui*) from "*Graomys griseoflavus*" from Samaipata and from Agua Hedionda. I examined one of the two specimens collected by de la Berrara at Samaipata in January 1955 at MACN (13104; the second specimen, 13105, was not found at the time) and reidentified it as *Graomys domorum domorum*. I did not see a voucher specimen for Agua Hedionda. Fonseca (1960: 105, 114, 121, 124) reported five other laelaptids, *Gigantolaelaps barrerai*, *G. goyanensis*, *Schistolaelaps mazzai*, *Tur amazonicus*, and *T. aymara* from Buen Retiro, and from "*Graomys griseoflavus*." Without a voucher specimen of the host, its identity remains problematical. Fonseca (1960: 130) reported *Bdellonyssus vitzthumi* (Macronyssidae) from Samaipata and Padilla. Specimens of the flea, *Neotyphloceras crassispina hemisus*, were reported from Padilla and Valle Grande (Hopkins and Rothschild, 1966: 136) with both *Graomys griseoflavus* and *Graomys medius* as hosts. Another flea, *Tiamastus cavicola*, was reported from Samaipata (Smit, 1987: 232) with *Graomys griseoflavus* as host, but I suspect it was *G. domorum*. I have not seen voucher specimens of the host(s), so identifications are uncertain.

FOOD: No data.

REPRODUCTION: Three females taken in December had two, four, and six embryos. Nonpregnant females were taken in July (2), September (5), and October (5).

Scientific synonyms used for Bolivian specimens are given under subspecies below:

Graomys domorum domorum (Thomas, 1902)

Eligmodontia domorum Thomas, 1902a: 132 (type locality Tapacari, department of Cochabamba, Bolivia; also Paratani, and Cochabamba); 1902b: 223 (Sucre, El Cabrado). Neveu-Lemaire and Grandidier, 1911: 10 (cited Thomas).

Phyllotis (*Graomys*) *domorum*: Osgood, 1916: 207 (Parotani).

Graomys griseoflavus domorum: Gyldenstolpe, 1932: 91 (Tapacari). Ellerman, 1941: 451.

Graomys dormorum: Tate, 1932a: 17.

Graomys griseoflavus: Fonseca, 1960: 93 (Samaipata). Hopkins and Rothschild, 1966: 136 (flea from Valle Grande). Smit, 1987: 232 (fleas from Samaipata).

Phyllotis griseoflavus domorum: Hershkovitz, 1962: 458.

Graomys domorum: Pearson and Patton, 1976: 341 (6.4 km N Parotani). Olds and Anderson, 1990: 72 (5 km by road SE of Comarapa). Braun, 1993: 48 (Tin Tin, Aiquile, Carlazo, Vallegrande, 10 km S of Vallegrande). Steppan, 1995: 105 (six localities in Cochabamba and Santa Cruz).

Graomys domorum domorum: Anderson, 1985b: 13 (name in list). Anderson, 1993: 40 (general distributional records). Anderson et al., 1993: 45 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (30) AND SPECIMENS (148): **Chuquisaca:** 1902/6517, Sucre, 3 BM; 1904/6449, 12 km N and 11 km E of Tarabuco, 4 AM, 4 MNLP, 3 MSB; 1905/6505, La Cabrada, 5 BM; 1912/6427, 11 km N and 16 km W of Padilla, 1 AM. **Cochabamba:** 1724/6609, Cochabamba, 1 AM, 1 BM, 3 from owl pellets in La Paz; 1725/6543, Tiraque, 1 FM; 1728/6545, 8 mi [= 13 km] NE Punata, 1 MVZ; 1730/6621, 6.4 km N (or 4 mi N) Parotani, 2 MVZ; 1731/6623, 15 mi [= 24 km] E Tapacari, 1 MVZ; 1731/6636, Tapacari, 7 BM; 1732/6607, 1.3 km W of Jamachuma, 2 AM, 1 CBF, 2 MSB; 1734/6621, Parotani, 33 AM, 4 BM, 2 FM; 1739/6524, Pocona, 1 FM; 1801/6525, Tin-Tin, 5 FM; 1807/6509, Aiquile, 3 FM; 1829/6510, 2 km NW of Peña Blanca, 8 AM. **Potosí:** 1918/6612, río Cachimayo, 3 AM; **Santa Cruz:** 1754/6429, Comarapa, 1 FM; 1758/6429, 5 km by road SE of Comarapa, 7 AM, 5 MSB; 1758/6433, 8 km SW of Comarapa, 1 AM; 1805/6420, 2 km NE of Quiñe, 4 CBF; 1809/6352, Samaipata, 2 MACN (one not seen); 1814/6419, 7 km SE by road from Ariruma, 1 AM; 1824/6419, 7 km by road SE of Ariruma, 1 AM; 1828/6408, 5.5 km by road NNE of Vallegrande (río Cienega), 12 AM; 1830/6406, Vallegrande, 5 US; 1833/6405, Guadalupe, 1 US; 1931/6336, 1 km S and 3 km W of Estancia Isibobo, 1 AM; 1948/6331, Cerro Itahuaticua, 1 AM; 2001/6313, San Antonio, Parapiti, 4 BM; coordinates uncertain, Florida, near Agua Hedionda, 1 FM.

Measurements in tables 18 and 20 are of specimens from 2 km NW of Peña Blanca (AM 255969–255971, 255973) and Olds et al. (1987: 10).

Graomys domorum taterona Thomas, 1926

Graomys taterona Thomas, 1926b: 320 (type locality "Tablada, 2000 m." in the department of Tarija, Bolivia). Gyldenstolpe, 1932: 92. Tate, 1932a: 17.

Graomys lockwoodi: Thomas, 1926d: 194 (Tupiza).

Phyllotis domorum taterona: Cabrera, 1961a: 494 (Tablada, Tupiza, the latter by inference). Anderson, 1993: 40 (Tablada).

Phyllotis griseoflavus griseoflavus: Hershkovitz, 1962: 452 (Tablada, Tupiza).

Graomys griseoflavus: Hopkins and Rothschild, 1966: 136 (fleas from Padilla, host identification uncertain but *Graomys domorum* seems more likely than *Graomys griseoflavus*; the name *Graomys medius* was used also).

Graomys domorum: Pearson and Patton, 1976 (considered *G. domorum* to be a separate species from *G. griseoflavus*, did not deal with subspecies). Voss, 1991: 112 (presence of gall bladder in two specimens from Carlazo).

Graomys domorum taterona: Anderson, 1985b: 13 (name in list).

LOCALITIES (11) AND SPECIMENS (107): **Potosí:** 2043/6557, 30 mi [= 48 km] WNW Catagaita, 1 MVZ; 2127/6543, Tupiza, 5 BM. 2143/6534, Yuruma, 2 MVZ. **Tarija:** 2106/6507, 20 mi [= 32 km] SSE Camataqui, 2 MVZ; 2115/6330, río Pilcomayo, 1 AM; 2126/6344, 2 km S and 5 km E of Palos Blancos, 1 AM; 2128/6445, 38 km by road ENE Tarija, Carlazo, 17 UMMZ; 2128/6448, Erquis, 6 AM; 2133/6447, Tablada, 8 BM, 2 FM; 2136/6445, 5 mi [= 8 km] S Tarija, 6 MVZ; 2147/6440, 11.5 km N and 5.5 km E of Padcaya, 33 AM, 9 CBF, 14 MSB.

Measurements in table 18 and 20 are of specimens from Tupiza (BM 26.6.12.15—19) and Tablada (BM 26.1.1.15–22), respectively.

Graomys griseoflavus (Waterhouse, 1837)

Pericote Común

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Mus* (*Phyllotis*) *griseo-flavus* was described by Waterhouse (1837: 28); type locality "Rio Negro" subsequently restricted to mouth of the río Negro, province of río Negro, Argentina. Gyldenstolpe (1932: 91) used the name *Graomys griseoflavus griseoflavus*. *Phyllotis cachinus* was described by Allen (1901c: 409), type locality alto río Cachi, Salta, Argentina.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements of 12 specimens in tables 18 and 20 are from Olds et al. (1987).

DISTRIBUTIONAL NOTES: Most localities are below elevation 500 m, ranging up to 2200 m (Tomina). Known localities are listed below and mapped in figure 744.

No Bolivian data are available on habits, behavior, or food.

PARASITOLOGY: Fonseca (1960: 92) reported ticks (*Ixodes* sp. and the laelaptid *Laelaps castroi*) from *Graomys griseoflavus* from Buen Retiro (1717/6338). This locality is north of any other records for *Graomys* in Bolivia, and I have not seen a voucher specimen to verify the identification of the host. He also reported laelaptid ticks, *Gigantolaelaps wolffsohni* and *Mysolaelaps heteronychus*, from *G. griseoflavus* from Floripondio (near 2147/6429, in Tarija); *M. heteronychus* was reported from Agua Hedionda (2147/6429; Fonseca, 1960: 107). Several species of fleas have been reported: *Polygenis* (*Gephyropsylla*) *klagesi samuelis* from Buen Retiro and Cabezas (Smit, 1987: 250; see note above); *Polygenis* (*Polygenis*) *roberti beebei* from Buen Retiro (Smit, 1987: 281); *Poly-*

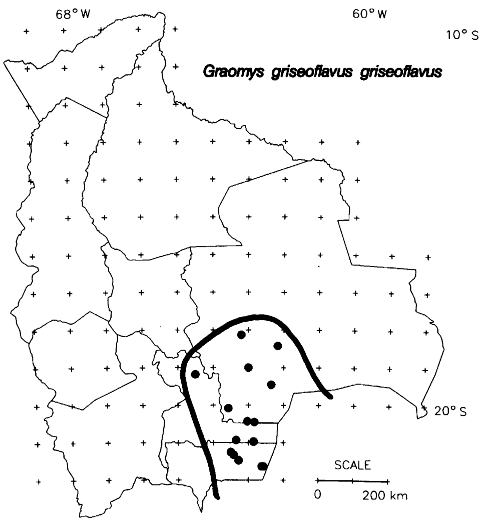


Fig. 744. Localities of known occurrence of *Graomys griseoflavus griseoflavus*.

genis (*Polygenis*) *bohlsi bohlsi* from Buen Retiro (Smit, 1987: 296); *Polygenis* (*Polygenis*) *tripus* from Cabezas (Smit, 1987: 303); and *Polygenis* (*Polygenis*) *trapidoi mendezi* from Agua Hedionda (Smit, 1987: 311). No voucher specimens for these host records have been seen either.

REPRODUCTION: One lactating female was taken in September, as were four females with no embryos.

Scientific synonyms used for Bolivian specimens are:

Graomys griseoflavus griseoflavus (Waterhouse, 1837)

Phyllotis griseoflavus: Thomas, 1898b: 3 (San Francisco).

Graomys griseoflavus griseoflavus: Gyldenstolpe, 1932: 91. Anderson, 1993: 40 (general distributional records).

Phyllotis griseoflavus cachinus: Cabrera, 1961a: 494 (department of Tarija, presumably on basis of Thomas's record from San Francisco).

Phyllotis griseoflavus griseoflavus: Hershkovitz, 1962: 451, 458 (Guanacos).

Graomys griseoflavus cachinus: Anderson, 1985b: 13 (name in list).

Graomys griseoflavus: Smit, 1987: 250, 303, 311 (fleas from Cabezas and Agua Hedionda). Steppan, 1995: 105 (four localities in Santa Cruz and Tarija).

LOCALITIES (15) AND SPECIMENS (210): **Chuquisaca:** 1911/6430, Tomina, 2 US; 2056/6321, 2 km S and 10 km E of Tiquipa, Laguna Palmer, 14 AM; 2058/6251, 30 km SE Carandaiti, 6 LACM. **Santa Cruz:** 1808/6312, 7 km E and 3 km N Ingeniero Mora, 4 AM; 1825/6210, Tita, 3 AM; 1900/6300, Campo de Guanacos, 6 CM, 2 FM; 1927/6221, Cerro Colorado, 17 EBD; 2005/6334, near Camiri, 1 CAS; 2026/6302, 26 km E of Boyuibe, 4 CBF, 5 MSB; 2027/6250, 53 km E of Boyuibe, 4 AM. **Tarija:** 2119/6325, 8 km S and 10 km E of Villa Montes, 72 AM; 2115/6330, San Francisco Mission, on río Pilcomayo, 1 BM (Thomas, 1898); 2128/6317, 35 km by road SE Villa Montes, Taringuiti, 18 UMMZ; 2138/6234, Estancia Bolivar, 16 AM, 15 CBF, 10 MSB; 2138/6237, 5 km W of Estancia Bolivar, 6 AM, 4 MSB.

Graomys pearsoni Myers, 1977

TAXONOMIC REMARKS: Steppan (1993: 203) analyzed the relationships of phyllotines cladistically and wrote that "the most parsimonious trees suggest that, due to the paraphyletic nature of *Graomys*, the undescribed species from Tapecua and *Andalgalomys* should be subsumed within *Graomys*. However, the bootstrap consensus tree and examination of characters indicate that the paraphyletic status of *Graomys* is insufficiently supported to justify taxonomic changes at this time."

One name used for Bolivian specimens has its type locality outside of Bolivia. *Graomys pearsoni* was described by Myers (1977: 1), type locality "410 km NW Villa Hayes by road, Departamento Boqueron, Paraguay." Williams and Mares (1978: 210) first used the name combination *Andalgalomys pearsoni*. *Andalgalomys* is now returned to the genus *Graomys*, following the analysis of Steppan (1995: 72).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: *Graomys pearsoni pearsoni* is much smaller (hind foot 22–25 mm) than *Graomys griseoflavus chacoensis* (hind foot 26–34 mm) and has proportionately shorter ears and tail. The tail is less strongly bicolored, less hairy, and lacks a pencil. Cranial and dental differences were also described by Myers. Measurements in tables 18 and 20 are

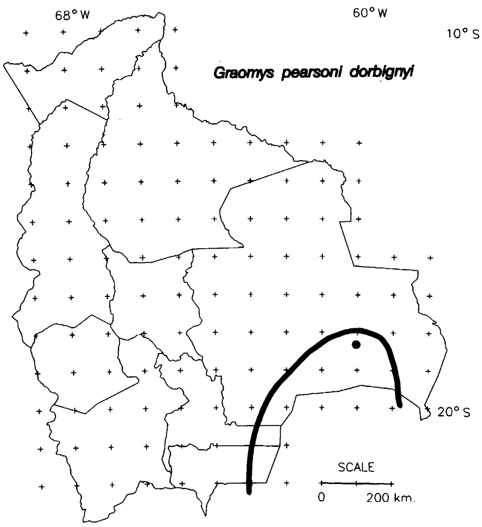


Fig. 745. Localities of known occurrence of *Graomys pearsoni dorbignyi.*

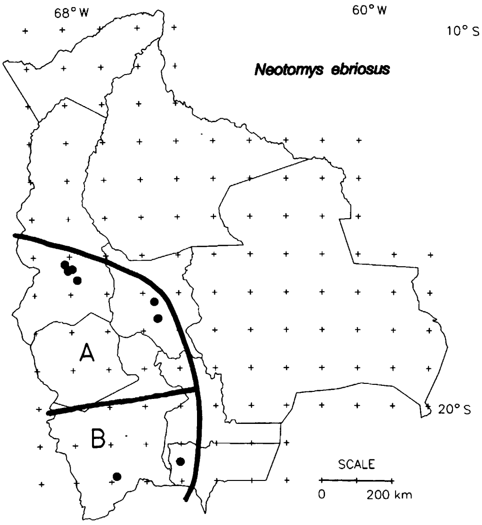


Fig. 746. Localities of known occurrence of two subspecies of *Neotomys ebriosus*, *N. e. ebriosus* (A) and *N. e. vulturnus* (B).

of specimens from 1819/6002 (MSB 55245 and AM 260762).

Distributional Notes: Known in Bolivia from only one locality at the edge of the Chaco, noted below and mapped in figure 745.

Habitat: "*Graomys pearsoni* inhabits dry grasslands, which occur as islands in the western Chaco of Paraguay. The surrounding thornscrub is occupied by *G. griseoflavus chacoensis*" (Myers, 1977).

No detailed Bolivian data are available on habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Graomys pearsoni dorbignyi (Olds, Anderson, and Yates), 1987

Andalgalomys pearsoni: Anderson, 1985b: 13 (name in list). Steppan, 1995: 105 (AM 260762).

Andalgalomys pearsoni dorbignyi: Olds et al., 1987: 9 (type locality 29.5 km W of Roboré, Santa Cruz, Bolivia). Anderson, 1993: 40 (1819/6002).

Localities (1) and Specimens (2): **Santa Cruz:** 1819/6002, 29.5 km W of Roboré, 1 AM, 1 MSB.

Genus *Neotomys* Thomas, 1894

Neotomys ebriosus Thomas, 1894

Orange-nosed Mouse

Taxonomic Remarks: See comment under *Holochilus* about a *Reithrodon* group that includes *Neotomys*. The detailed cladistic analysis of Steppan (1995: 91) confirmed such a group to include *Reithrodon*, *Euneomys*, and *Neotomys*, but excluded *Holochilus*.

Some names used for Bolivian specimens have type localities outside of Bolivia. *Neotomys ebriosus* was described by Thomas (1894b: 346), type locality Valle del Vitoc, department of Junín, Peru. *Neotomys vulturnus* was described by Thomas (1921e: 612), type locality Sierra de Zenta, province of Jujuy, Argentina. Sanborn (1947a: 54) first used the name combination *Neotomys ebriosus vulturnus*.

Distributional Notes: Occurs in the highlands, ranging from 3000 m (Incachaca) to 4500 m (Lipez). Known localities are listed below and mapped in figure 746.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: A pregnant female (number of embryos not noted) was taken in February.

Scientific synonyms used for Bolivian specimens are given under subspecies below:

Neotomys ebriosus ebriosus Thomas, 1894

Neotomys ebriosus: Voss and Linzey, 1981: 40 (Cumbre). Mercado and Miralles, 1991: 295 (La Paz Valley).

Neotomys ebriosus ebriosus: Sanborn, 1947a: 52 (La Cumbre, Pongo). Anderson, 1985b: 13 (name in list). Anderson, 1993: 40 (general distributional records).

LOCALITIES (7) AND SPECIMENS (17): **Cochabamba:** 1714/6541, Incachaca, 1 BM; 1740/6535, 7.5 km SE of Rodeo, 3800 m elevation, 1 MSB; 1741/6536, 7.5 km SE of Rodeo, 4000 m elevation, 1 MSB. **La Paz:** 1612/6808, Lago Viscachani, 1 AM, 1 CBF; 1620/6756, Pongo, 7 AM; 1622/6803, La Cumbre, 3 AM, 1 IE; 1637/6748, S slope of Illimani, 1 Vienna (Spitzenberger, in litt.).

Measurements in tables 18 and 20 are of specimens from Pongo (AM 72737—72739, 72742–72743, 74153–74154) and La Cumbre (AM 72744).

Neotomys ebriosus vulturnus Thomas, 1921

Neotomys vulturnus Thomas, 1926b: 322 (Sama); 1926d: 195 (Lipez).

Neotomys ebriosus vulturnus: Cabrera, 1961a: 500 (southern Bolivia). Anderson, 1985b: 13 (name in list). Anderson, 1993: 40 (general distributional records).

LOCALITIES (2) AND SPECIMENS (9): **Potosí:** 2151/6651, Lipez, 4 BM. **Tarija:** 2129/6502, Sama, 5 BM.

Measurements in tables 18 and 20 are of specimens from Lipez (BM 26.6.12.53 to 56).

Genus *Phyllotis* Waterhouse, 1837

A vernacular name for the genus and other genera of large-eared phyllotine rodents is pericote.

TAXONOMIC REMARKS: Originally proposed as a subgenus of *Mus* (Waterhouse, 1837: 28), with *M.* (*P.*) *darwinii* as type species. Gray and Gray (1847: 41) reported two specimens, in the Bridges's collection, from "Bolivia" as "Mus (Phyllotis) ——?" but the identification is uncertain. They also reported another Bolivian specimen of Bridges as "Mus ——?" and its identity is even less certain. The genus *Phyllotis* is the most speciose of the phyllotines. Cladistic analyses by both Braun (1993: 19) and Steppan (1993: 194; 1995: 67) suggested that the genus may be polyphyletic. However, considerable uncertainty remains about what may be monophyletic groups within the assemblage and thus few taxonomic changes seem warranted at this time.

The gender for nomenclatural purposes of the generic name *Phyllotis* has been argued by Woodman (1993) and Pritchard (1993). Woodman treated *Phyllotis* as feminine and would accordingly revise the spelling of the specific epithet *caprinus* to *caprina* (considering only names pertinent to Bolivia; see also notes under the genus *Myotis*). Pritchard treated *Phyllotis* as masculine. As noted in the account of *Myotis*, I do not find the arguments of either author to be overwhelmingly convincing. My choice is to use the names as used in Wilson and Reeder (1994). Steppan (1995: 79) discussed the problem and likewise chose to use the names in Wilson and Reeder.

Phyllotis caprinus Pearson, 1958

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from near Camataqui (MVZ 120113–120125, 120130—120131) and from Yuruma (BM 26.6.12.20 + 25, 26.6.12.34, 66.1687).

DISTRIBUTIONAL NOTES: Ranges from about elevation 2100 m (Tambo) to 3750 m (4.5 km E of Iscayachi). Known localities are listed below and mapped in figure 747.

No Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Ten females in October had no embryos.

Scientific synonyms used for Bolivian specimens are:

Phyllotis caprinus Pearson, 1958: 435 (type locality Tilcara, province of Jujuy, Argentina; Camargo, Yuruma, and near Camataqui). Anderson, 1985b: 13 (name in list). Anderson, 1993: 39 (general distributional records).

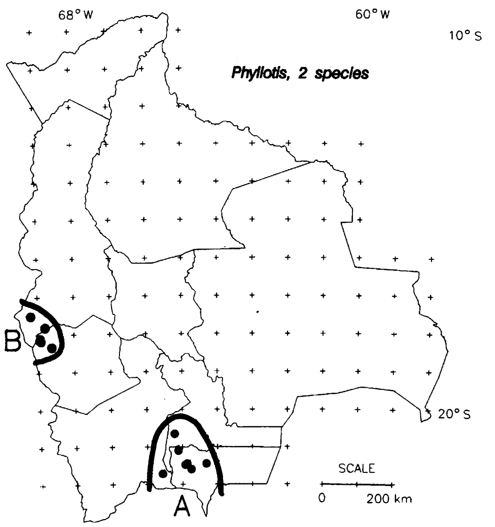


Fig. 747. Localities of known occurrence of two species of *Phyllotis*, *P. caprinus* (A) and *P. chilensis* (B).

Phyllotis darwini caprinus: Hershkovitz, 1962: 62 (Camargo, Yuruma, Camataqui, Tarija).

Phyllotis caprina: Woodman, 1993: 544 (change of name).

Localities (7) and Specimens (58): **Chuquisaca:** 2039/6513, Camargo, 3 MVZ. **Potosí:** 2143/6534, Yuruma, 9 BM, 1 MVZ. **Tarija:** 2106/6507, 20 mi [= 32 km] SSE Camataqui, 27 MVZ; 2127/6419, Rancho Tambo, 61 km by road E of Tarija, 1 AM; 2127/6452, Serranía Sama, 6 AM, 5 CBF, 4 MSB; 2129/6455, 4.5 km E of Iscayachi, 1 CBF; 2136/6445, 8 km (= 5 mi) S of Tarija, 1 MVZ.

Phyllotis chilensis Mann, 1945

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Phyllotis osgoodi* was described by Mann (1945: 84), type locality Parinacota, about 14,800 ft elevation, Tarapacá, Chile. In the same publication, *Phyllotis arenarius chilensis* was described (Mann, 1945: 84), type locality Parinacota, about 14,800 ft elevation, Tarapacá, Chile. Cabrera (1961a: 487) argued emphatically that if *osgoodi* and *chilensis* are synonyms, then the code of nomenclature, under page priority, requires the recognition of *osgoodi* (p. 81) rather than *chilensis* (p. 84, in the same publication). The Code in effect from 1905 to 1948 (Article 28, as cited by Mayr et al., 1953: 222) provided that the first reviser was to select the name to use when two names were published in the same article. In 1948 this rule was revoked and page, line, and even left-to-right priority was adopted. The meeting in Paris in 1948 initiated a complete revision of the Code, the process of which extended over a number of years until 1961 when the first edition of the revised Code was published. A later edition was published in 1964 (with the printed date on a paste-over on the title page). Sometime in this process, between 1948 and 1964, page/line/position priority was dropped and the first reviser principle was returned. Now, Article 24 of the Code (ICZN, 1964, 1985) states that "if more than one name for a single taxon, or identical names for different taxa, are published simultaneously, whether in the same or different works, their relative priority is determined by the action of the first reviser." In the present case, Pearson (1958) may be regarded as the first reviser and his selection of *chilensis* is proper under the Code. *Phyllotis chilensis* has been treated as a subspecies or synonym until recently.

Steppan (1995: 82) wrote that "unpublished morphometric, anatomical, and molecular data . . . indicate the specific separation of *chilensis* from *P. x. rupestris* in southern Peru. The two taxa form clearly bimodal clusters in principal component space with little overlap. Where good series exist along transects, the transition between the taxa is sharp, identifiable to within a kilometer." This hypothesis of specific distinction needs further testing. Bolivian specimens have the characters given by Pearson (1958: 415) for *P. d. chilensis*.

Morphological Characters and Comparisons: Measurements in tables 18 and 20 are of specimens from near Sajama (at AM and CBF). Values for tail length expressed as percentage of total length range from 45 mm to 53 (mean 50.2, n = 31).

Distributional Notes: Ranges from elevation 3850 m (Estancia Agua Rica) to 4500 m (Quebrada Hohuiri). Known localities are listed below and mapped in figure 747.

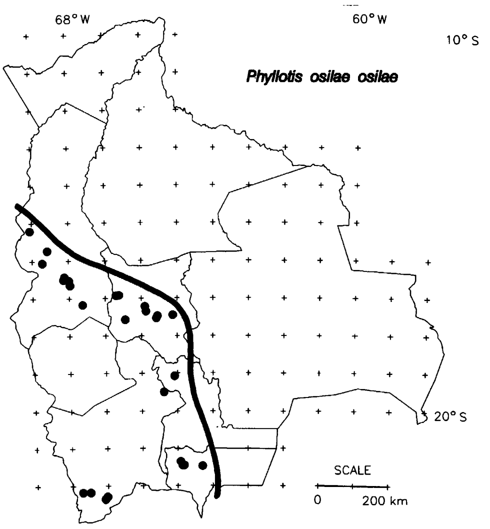


Fig. 748. Localities of known occurrence of *Phyllotis osilae osilae*. Compare with the following map. Separate maps were drawn because localities are close to each other and their placement on one map would make it difficult to distinguish the two.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Phyllotis darwini chilensis: Pearson, 1958: 415 (Esperanza, Estación Pérez, Mt. Sajama region).

Phyllotis darwini rupestris: Hershkovitz, 1962: 247 (same three localities; regarded *chilensis* as a synonym of *rupestris*).

Phyllotis xanthopygus rupestris: Anderson, 1993: 39 (included some of the following locality records). Steppan, 1995: 105 (Esperanza).

Phyllotis xanthopygus chilensis: Yensen and Tarifa, 1993: 56 (38 from four localities near Sajama, and 16 from owl pellets).

Phyllotis chilensis: Steppan, 1995: 82 (basis for recognition as a species).

LOCALITIES (9) AND SPECIMENS (66): **La Paz:** 1730/6910, Estación Pérez, 11 FM; 1749/6847, Esperanza, province of Pacajes, 3 FM. **Oruro:** 1803/6856, 9 km N and 4 km E of Sajama, Jincho Asjata Loma, 2 CBF; 1807/6900, Mount Sajama region, 3 FM; 1808/6857, Parque Nacional del Nevado Sajama, 4 CBF; 1808/6857, Quebrada Kohuiri, Parque Nacional del Nevado Sajama, 27 CBF; 1808/6858, 1 km SE of Sajama, 5 CBF; 1810/6855, 6 km NE of Lagunas, 6 AM; 1820/6836, Estancia Agua Rica, 40 km E and 22 km S of Sajama, 4 AM, 1 MSB.

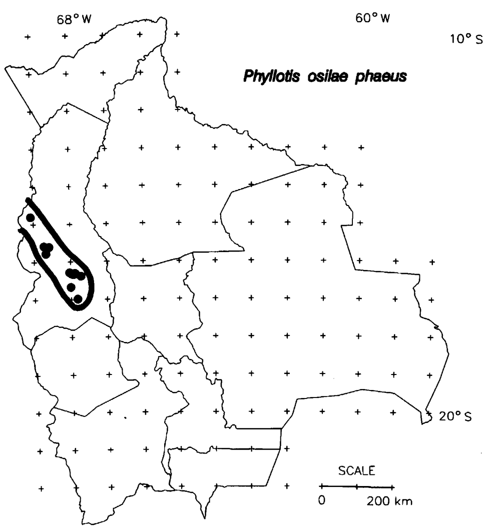


Fig. 749. Localities of known occurrence of *Phyllotis osilae phaeus*.

Phyllotis osilae Allen, 1901

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Phyllotis osilae* was described by Allen (1901a: 44), type locality "Osila [or Asillo, department of Puno,] Peru (alt. about 12,000 feet)." *Phyllotis phaeus* was described by Osgood (1944: 193), type locality Limbani, department of Puno, Peru. Pearson (1951: 144) first used the name combination *Phyllotis osilae osilae*. *Phyllotis nogalaris* was described by Thomas (1921e: 611), type locality Higuerilla, department of Valle Grande, province of Jujuy, elevation 2000 m, Argentina.

KARYOLOGY: A male from 9.6 km W of Parotani had 70 diploid chromesomes (Pearson and Patton, 1976: 341).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figures 748 and 749. The subspecies are mapped separately for clarity. *Phyllotis osilae osilae* ranges widely in the highlands, from elevation 1700 m (Pino) up to at least 4900 m (2210/6730). *P. o. phaeus* occupies the eastern slope of the cordillera oriental from elevation 2657 m (Sorata) up to 3650 m (Pelechuco).

No detailed Bolivian data are available on habitat, habits, behavior, or food.

PARASITOLOGY: Specimens of the flea, *Neotyphloceras crassispina hemisus*, were reported from Ladera (Hopkins and Rothschild, 1966: 136). I have not seen voucher specimens of the host.

REPRODUCTION: Females without embryos were recorded in July (1), August (2), and September (6).

Scientific synonyms used for Bolivian specimen are given under subspecies below:

Phyllotis osilae osilae
Allen, 1901

Phyllotis osilae: Yoneda, 1984: 12 (Collana, Chasquipampa). Mercado and Miralles, 1991: 295 (La Paz Valley). Patterson, 1992: 29 (Huancuni).

Phyllotis lutescens Thomas, 1902a: 131 (type locality Choro, department of Cochabamba, Bolivia; also Choquecamate). Neveu-Lemaire and Grandidier, 1911: 11 (Choro, Choquecamate). Thomas, 1926: 321 (Pino). Gyldenstolpe, 1932: 87. Tate, 1932: 17.

Phyllotis arenarius: Thomas, 1902b: 224 (Lagunillas, El Cabrado).

Phyllotis osilae osilae: Pearson, 1958: 426 (10 localities in Bolivia). Cabrera, 1961a: 490. Hershkovitz, 1962: 380 (seven Bolivian localities). Anderson, 1985b: 13 (name in list). Anderson, 1993: 39 (general distributional records).

Phyllotis nogalaris: Hopkins and Rothschild, 1966: 136 (fleas from Ladera, 1827/6356).

Phyllotis (Phyllotis) osilae: Pearson and Patton, 1976: 341 (9.6 km W Parotani).

LOCALITIES (28) AND SPECIMENS (101): **Chuquisaca:** 1905/6505, La Cabrada, 1 BM. **Cochabamba:** 1655/6637, Choquecamate, 2 BM; 1656/6642, Choro, 3 BM, 5 FM; 1713/6554, 13 km N of Colomi, 2 AM, 1 CBF, 2 MSB; 1721/6552, Colomi, province of Chapare, 1 MACN (Pearson, 1958); 1734/6627, 6 mi (or 9.6 km) W of Parotani, 1 MVZ; 1727/6507, 10 mi [= 16 km] NE of Puñata, 5 MVZ; 1728/6533, 15 mi [= 24 km] ESE of Tiraque, 3 BM, 7 MVZ; 1732/6535, Vacas, 1 CM. **La Paz:** 1512/6903, Charazani, 7 AM; 1512/6903, 2 km W of Charazani, 3 AM; 1544/6835, Huancuni, 4 (Patterson, 1992: 29); 1603/6843, Achacachi, 1 US; coordinates uncertain, Zongo Valley, 15 km "de abra," 3 CBF; 1625/6807, río Caluyo, 10 km NNE of La Paz, 1 MNLP; 1630/6809, La Paz, 5 BM; 1631/6800, Chasquipampa, 1 (Yoneda, 1984); 1639/6758, Collana, 9 MNLP; 1710/6738, Salla, 11 MNLP. **Potosí:** 1930/6523, Lagunillas, 3 BM; 2210/6730, 22.5 km E of Campamento ENDE, 1 MNLP; 2210/6743, 1 km E of Campamento Sol de Mañana II, 1 MNLP; 2217/6701, Khastor, 3 MNLP; 2221/6705, Laguna Chojllas, 1 MNLP. **Tarija:** 2121/6455, 10 mi [= 16 km] NW of Tarija, 1 MVZ; 2127/6449, 1 km E of Tucumilla, 4 AM, 3 CBF, 1 MSB; 2127/6452, Serranía Sama, 1 AM, 2 CBF; 2128/6418, Pino, 1 BM.

Measurements in tables 18 and 20 are of specimens from Charazani (AM 247867—247873).

Phyllotis osilae phaeus
Osgood, 1944

Phyllotis phaeus: Sanborn, 1950: 5 (río Aceramarca, Alaska Mine, Pongo).

Phyllotis osilae phaeus: Pearson, 1958: 429 (six Bolivian localilties). Hershkovitz, 1962: 255 (six Bolivian localities). Anderson, 1985b: 13 (name in list). Anderson, 1993: 39 (general distributional records).

Phyllotis osilae osilae: Pearson, 1958: 426 (Sorata).

Phyllotis osilae: Voss and Linzey, 1981: 40 (Pongo). Olds and Anderson, 1990: 72 (Pelechuco). Voss, 1991: 112 (presence of gall bladder in five specimens from Pongo).

LOCALITIES (11) AND SPECIMENS (97): **La Paz:** 1448/6904, Pelechuco, 6 AM; 1535/6843, Tacacoma, 2 AM; 1536/6835, Ayañe, 3 BM; 1547/6840, Sorata, 3 AM; 1617/6802, Alaska Mine, 5 AM; 1618/6753, río Aceramarca, 5 AM; 1619/6758, Mina Lourdes, 3800 m elevation, 11 AM, 8 CBF, 8 MSB; 1620/6756, Pongo, 41 AM; 1623/6743, Yanacachi, 1 BM; 1640/6800, Colina Cachapa, 3 IE; 1659/6749, Caracato, 1 AM.

Measurements in tables 18 and 20 are of specimens from Pelechuco (AM 247877—247883).

Phyllotis wolffsohni Thomas, 1902

Pericote de Wolffsohn

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from 1731/6623 (MVZ 119978, 120181–120182, 120184—120186,

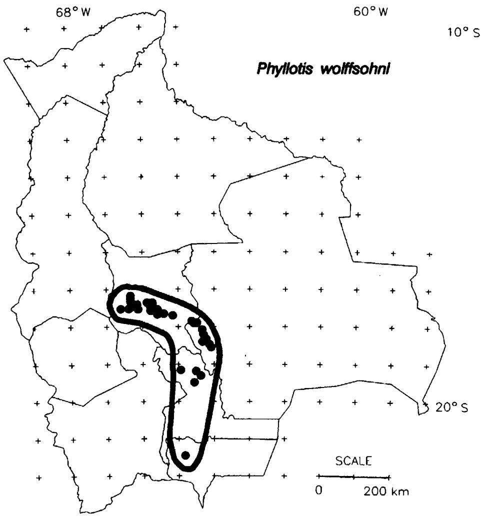


Fig. 750. Localities of known occurrence of *Phyllotis wolffsohni*.

120180) and near Rodeo (AM 260922–260939, in part).

Karyology: Two specimens from 6.4 km N of Parotani had 54 diploid chromosomes (Pearson and Patton, 1976: 341).

Distributional Notes: Ranges from elevation 1300 m (Río Limón) to 3875 m (1740/6535). Known localities are listed below and mapped in figure 750.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: One pregnant female with two embryos was recorded in March. A lactating female was recorded in July. Females with no embryos were recorded in March (2), July (6), and September (5).

Scientific synonyms used for Bolivian specimens are:

Phyllotis Wolffsohni Thomas, 1902a: 131 (type locality Tapacari, department of Cochabamba, Bolivia). Neveu-Lemaire and Grandidier, 1911: 11 (Tapacari). Thomas, 1926b: 321 (Sama).

Phyllotis wolffsohni: Tate, 1932a: 16. Gyldenstolpe, 1932: 86. Pearson, 1958: 434 (15 Bolivian localities). Anderson, 1985b: 13 (name in list). Patterson, 1992: 29 (Liriuni, Toncoma, Ucho Ucho; photo of skull). Braun, 1993: 48 (Taquina, Cochabamba, Pocona, Tomina). Anderson, 1993: 39 (general distributional records). Steppan, 1995: 105 (six localities in Chuquisaca, Cochabamba, and Santa Cruz).

Phyllotis darwini wolffsohni: Hershkovitz, 1962: 248 (13 Bolivian localities).

Phyllotis (*Phyllotis*) *wolffsohni*: Pearson and Patton, 1976: 341 (6.4 km N Parotani).

Localities (36) and Specimens (201): **Chuquisaca:** 1904/6449, 12 km N and 11 km E of Tarabuco, 6 AM, 3 MNLP, 1 MSB; 1909/6456, 3 km N of Tarabuco, 1 CBF; 1911/6430, Tomina, 2 US (Pearson, 1958); 1918/6422, 9 km by road N of Padilla, 6 AM, 3 CBF, 4 MSB; 1929/6433, Horcus, 80 km SE of Sucre, 1 MVZ. **Cochabamba:** 1710/6620, Ucho Ucho, 2 (Patterson, 1992: 29); 1715/6620, Toncoma, 5 (Patterson, 1992: 29); 1719/6620, Liriuni, 1 (Patterson, 1992: 29); 1721/6543, Cuchicancha, 1 AM; 1721/6552, Colomi, 1 MACN (Pearson, 1958), 1 FM; 1724/6609, Cochabamba, 3 BM, 5 CM, 2 FM; 1724/6609, Taquiña, 5 FM, 1 MACN (Pearson, 1958); 1725/6543, Tiraque, 18 BM, 1 FM (Pearson, 1958); 1727/6547, 10 mi [= 16 km] NE Punata, 2 MVZ; 1728/6545, 8 mi [= 13 km] NE Punata, 3 MVZ; 1730/6621, 6.4 km N (or 4 mi N) Parotani, 2 MVZ; 1731/6623, 15 mi [= 24 km] E Tapacari, 8 MVZ; 1731/6636, Tapacari, 2 BM, 3 FM; 1732/6535, Vacas, 3 FM; 1732/6607, 1.3 km W of Jamachuma, 6 AM, 4 CBF, 4 MSB; 1734/6546, Arani, 6 BM; 1739/6524, Pocona, 19 BM, 1 FM; 1740/6535, 9.5 km by road SE of Rodeo, then 2.5 km on road to ENTEL antenna, 18 AM, 2 CBF; 1740/6535, 7.5 km SE of Rodeo, 3800 m elevation, 1 MSB; 1742/6509, Totora, 4 BM; 1745/6502, 17 km E of Totora, 1 MSB; 1751/6437, 21 km by road W of Comarapa, 1 AM. **Santa Cruz:** 1754/6429, Comarapa, 10 BM, 2 FM; 1754/6434, 5 mi [= 8 km] W Comarapa, 7 MVZ; 1805/6420, 2 km NE of Quiñe, 1 MNK; 1812/6418, 17 km S of Quiñe (Estancia Laja), 1 AM, 8 MSB; 1820/6413, 7 km SE of Ariruma, 3 AM; 1824/6419, 7 km by road SE of Ariruma, 3 AM; 1828/6408, 5.5 km by road NNE of Vallegrande (río Cienega), 1 AM; 1833/6405, Guadalupe, 10 km S Vallegrande, 1 US. **Tarija:** 2127/6449, 1 km E of Tucumilla, 1 AM.

Phyllotis xanthopygus (Waterhouse), 1837

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Mus darwini* was described by Waterhouse (1837: 28), type locality Coquimbo, Chile. *Mus (Phyllotis) xanthopygus* was described by Waterhouse (1837: 28), type locality Santa Cruz, Santa Cruz Territory, Argentina. *Mus rupestris* was described by Gervais (1841: 51); type locality high mountains of Cobija, department of Antofagasta, Chile, restricted to the "Río San Pedro, a tributary of the Loa" by Hershkovitz (1962: 305). The elevation of San Pedro is unknown. *Phyllotis ricardulus* was described by Thomas (1919b: 493), type locality Otro Cerro, northeast of Chumbicha, province of Catamarca, Argentina. Spotorno and Walker (1983: 51) and Walker et al. (1984: 229) separated *darwini* from *xanthopygus*, including by inference other Andean highland subspecies previously referred to *darwini*. Bozinovic and Marquet (1991: 734), in an ecological study, continued the earlier use of the name *Phyllotis darwini rupestris* for populations in the Pacific coastal desert of northern Chile without critically reviewing the taxonomic question of whether this population and other populations assigned to *rupestris* in Bolivia and Chile are conspecific with *darwini*, with *xanthopygus*, or with some other species (Marquet, in litt.). Musser and Carleton (*in* Wilson and Reeder, 1993: 739) treated *P. xanthopygus* and *P. darwini* as separate species and assigned *P. xanthopygus* to a separate range in Argentina and Chile. These authors retained in *P. darwini* all other populations formerly assigned to *P. darwini*, including populations in Bolivia. Near the geographic center of these equivocally assigned forms, on either side of the border between northern Chile and Bolivia, is *Phyllotis chilensis*, now treated as a separate species. Clearly, further revisionary work is needed.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from Lago Viscachani (1612/6808) and Viscachani (1712/6757), respectively.

DISTRIBUTIONAL NOTES: Ranges widely in the highlands, from elevation 2000 m (Tupiza) to 4500 m (Lipez). Known localities are listed below and mapped in figure 751.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

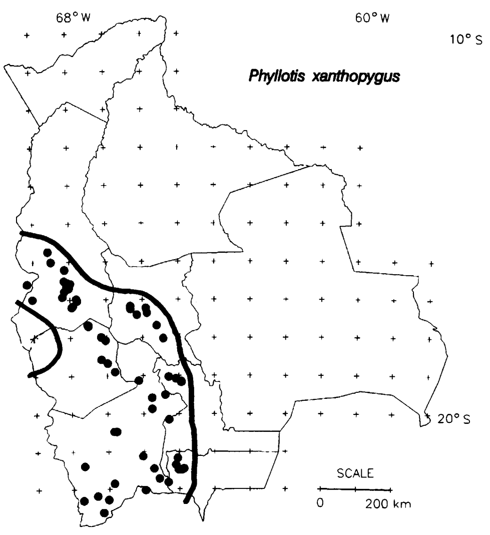


Fig. 751. Localities of known occurrence of *Phyllotis xanthopygus rupestris.*

REPRODUCTION: Pregnant females were recorded in March (one with 2 embryos) and in May (one with five embryos). A lactating female was recorded in August. Females (22) without embryos were recorded in March (1), May (1), July (6), September (4), October (9), and December (1).

Scientific synonyms used for Bolivian specimens are given under the subspecies below:

Phyllotis xanthopygus rupestris (Gervais, 1841)

Phyllotis arenarius Thomas, 1902b: 224 (type locality Uyuni, department of Potosí, Bolivia; also Oruro, Sucre, and Potosí). Neveu-Lemaire and Grandidier, 1911: 11 (citing Thomas, 1902). Gyldenstolpe, 1932: 87. Tate, 1932: 17.

Phyllotis ricardulus: Thomas, 1926d: 194 (San Antonio de Lipez, Yuruma).

Phyllotis wolffsohni: Thomas, 1926b: 321 (Sama).

Phyllotis darwini rupestris: Osgood, 1943: 205 (Lipez). Hershkovitz, 1962: 247 (La Paz, Cosmini, Oruro, 40 mi S Oruro, Chianta, Tin Tin, Sucre, Potosí, 20 mi S Potosí, Uyuni, 5 mi N Villazon, 25 mi N Villazon).

Phyllotis darwini: Yoneda, 1984b: 12 (Los Pinos, Huajchilla, Mecopaca); 1984c: 56 (Huajchilla, Salla). Mercado, 1990: 1 (Valle de La Paz). Voss, 1991: 112 (presence of gall bladder in two specimens from 1840/6659) Mercado, 1991: 28 (Valle de La Paz).

Phyllotis xanthopygus: Salazar Bravo, 1990: 194 (800 m W of Pozo geotermico Sol de Mañana, Khastor, Laguna Chojllas, and 10 km E of Cerro Quetena).

Phyllotis cf. *xanthopygus*: Patterson, 1992: 28 (Huancuni, Toncoma, Ucho Ucho; photo of skull).

Phyllotis xanthopygus rupestris: Anderson, 1985b: 13 (name in list). Mercado and Miralles, 1991: 295 (La Paz Valley). Anderson, 1993: 39 (general distributional records).

Phyllotys xanthopygus: Miralles and Salazar Bravo, "1990": 11 (misspelling of generic name in list).

LOCALITIES (73) AND SPECIMENS (493): **Chuquisaca:** 1902/6517, Sucre, 2 BM; 1905/6505, La Cabrada, 1 BM; 1909/6456, 3 km N of Tarabuco, 3 CBF, 2 MSB; 1910/6453, 2 km N and 3 km E of Tarabuco, 1 AM, 3 CBF, 2 MSB; 1910/6455, 2 km W of Tarabuco, 1 AM; 1910/6456, 2 km N of Tarabuco, 7 AM, 3 MNLP, 4 MSB; 2009/6517, 68 km by road N of Camargo, 3 AM, 1 MSB. **Cochabamba:** 1710/6620, Ucho Ucho, 5 (Patterson, 1992: 28); 1713/6554, 13 km N of Colomi, 1 AM, 2 CBF, 2 MSB; 1714/6557, 16.5 km NW of Colomi, 3 AM, 3 CBF, 2 MSB; 1715/6620, Toncoma, 1 (Patterson, 1992: 28); 1721/6552, Colomi, 1 MACN (not examined); 1724/6609, Taquiña, 43 MACN (not examined); 1741/6536, 7.5 km SE of Rodeo, 8 AM, 8 CBF, 8 MSB; 1745/6502, 17 km E of Totora, Tinkusiri, 3 AM, 1 CBF, 3 MSB; 1801/6525, Tin Tin, 1 FM; coordinates uncertain, Muellemuelle, 2 CM. **La Paz:** 1544/6835, Huancuni, 1 (Patterson, 1992: 28); 1600/6830, Titicaca (coordinates uncertain), 15 from owl pellets in collection in La Paz; 1612/6808, Lago Viscachani, 12 AM, 9 CBF, 9 MSB; 1614/6808, Zongo Valley, 11 km from divide, 1 CBF; 1630/6809, La Paz, 1 BM, 1 MACN; 1633/6803, Los Pinos, 2 MNLP; 1634/6759, Palca, 1 BM; 1634/6910, Khanuma, 2 IE; 1639/6803, Huajchilla, 2 EBD, 11 IE (2 not seen), 55 MNLP, 58 (Yoneda, 1984b); 1639/6805, 4 km SW of Huajchilla, 3 IE; 1640/6801, Mecapaca, 2 EBD; 1641/6801, Mecapaca, 23 km SSE of La Paz, 2 MNLP; 1641/6801, Tatarani, Quebrada Campana, 2 AM; 1642/6802, Quebrada Campana, 2 AM; 1647/6809, 20 mi [= 32 km] S La Paz, 4 MVZ; 1655/6812, Cosmini, 1 BM; 1659/6749, Caracato, 4 AM; 1659/6902, 8.5 km W of San Andrés de Machaca, 3 MSB; 1702/6748, Amullachta, 5 km down valley from Caracato, 6 UMMZ; 1710/6755, Huaraco, 8 IE; 1712/6757, Viscachani, 4 AM; 1727/6737, Huaraco-Antipampa, 9 from owl pellets (Penaranda); coordinates uncertain, Taipichullo, 1 IE; coordinates uncertain, Serranía Sircuma, 1 IE. **Oruro:** 1740/6730, 1 km W of Huancaroma, 4 AM, 2 MSB; 1740/6731, 9 km S and 0.8 km W of Eucaliptus, 1 AM; 1742/6730, 12 km S and 1.6 km W of Eucaliptus, 1 AM; 1759/6709, Oruro, 1 BM; 1804/6702, 11 km N Machacamarca, 1 AM; 1834/6709, 40 mi [= 64 km] S Oruro, 2 MVZ; 1840/6659, 10 km by road SW Pazña, Finca Santa Helena, 2 UMMZ; 1854/6647, Chianta, 1 BM; 1908/6607, 7 km S and 4 km E of Cruce Ventilla, 3 AM; 1 MSB. **Potosí:** 1931/6651, río Sevaruyo, 1 from owl pellet (Peñaranda); 1930/6523, Lagunillas, 3 BM; 1935/6545, Potosí, 2 BM; 1952/6545, 20 mi [= 32 km] S Potosí, 6 MVZ; 2028/6645, 5 mi [= 8 km] E Uyuni, 5 MVZ; 2028/6646, 4 mi [= 6.4 km] E Uyuni, 5 MVZ; 2028/6650, Uyuni, 6 BM, 1 ANSP; 2107/6602, 40 km by road SE of Atocha, 1 AM; 2123/6741, 2 km N of Villa Alota, 1 EBD; 2127/6543, Tupiza, 1 BM; 2143/6534, Yuruma, 9 BM; 2149/6519, 25 mi [= 40 km] NE Villazon, 4 MVZ; 2151/6651, San Antonio de Lipez, 16 BM, 3 FM, 2 KU; 2202/6558, 5 mi [= 8 km] N Villazon, 2 MVZ; 2211/6720, río Quetena, Quetena Chica, 3 EBD; 2217/6701, Khastor, 1 CBF; 2218/6744, 21 km by road SE of ENDE camp, Laguna Colorado, 1 MSB; 2237/6710, Laguna Kalina, 1 EBD. **Tarija:** 2110/6503, 25 mi [= 40 km] SSE Camataqui, 8 MVZ; 2121/6506, 12 mi [= 19 km] NW Iscayachi, 2 MVZ; 2127/6452, Serranía Sama, 3 AM; 2129/6455, 4.5 km E of Iscayachi, 2 AM, 5 CBF, 5 MSB; 2129/6457, 1 km E of Iscayachi, río Tomayapo, 7 AM, 2 MSB; 2129/6502, Sama, 3 BM. **Department unknown:** "Bolivia" only, 1 BM.

Phyllotis, species not determined

LOCALITIES (11) AND SPECIMENS (32): **Chuquisaca:** 1908/6456, 4 km N of Tarabuco, 2 AM, 1 MNLP; 1910/6453, 2 km N and 3 km E of Tarabuco, 1 AM, 3 MNLP, 2 MSB; 1912/6427, 11 km N and 16 km W of Pa-

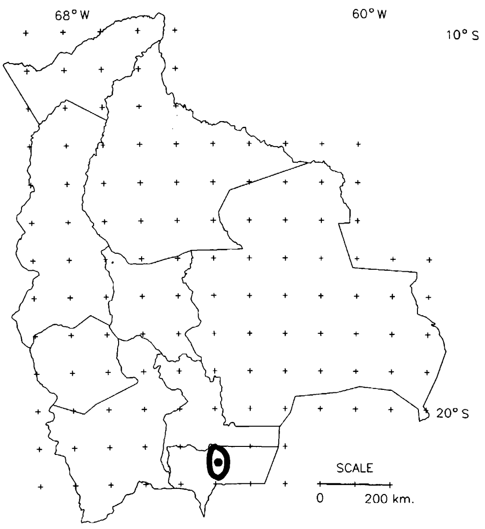


Fig. 752. Locality of known occurrence of undescribed phyllotine.

dilla, 1 AM; 1918/6422, 9 km by road N of Padilla, 5 AM, 2 MNLP, 4 MSB; 1933/6408, Río Limón, 1 AM. **Cochabamba:** 1724/6609, Cochabamba, 1 AM [owl pellet]. **La Paz:** 1603/6804, Isla de Luna, 4 CBF; 1622/6807, Laguna Kellguani, 1 MNLP; 1630/6809, La Paz (assumed to be the city), 1 MACN (not examined). **Santa Cruz:** 1809/6352, Samaipata, 2 MACN (not examined); coordinates uncertain, Nueva Moka, 1 MACN (not examined).

Undescribed Phyllotine

DISTRIBUTIONAL NOTES: Known only from one locality, at elevation 1500 m, mapped in figure 752.

LOCALITIES (1) AND SPECIMENS (2): **Tarija:** 2126/6355 Tapecua, 1 AM, 1 CBF.

Measurements in tables 18 and 20 are of these specimens.

Sigmodontinae incertae sedis

TAXONOMIC REMARKS: The tribal placement of *Holochilus* is problematical. The placement of the genus in the tribe Sigmodontini has been questioned. Steppan (1995: 62) wrote that "*Holochilus* should be removed from the Sigmodontini, leaving only *Sigmodon*" (see further comments under Sigmodontinae).

Genus *Holochilus* Brandt, 1835

TAXONOMIC REMARKS: The taxonomic history of *Holochilus* was summarized by Tate (1932b). Various rodent genera with somewhat enlarged molars, enamel folds, and flattened occlusal surfaces through wear have been associated, loosely or more explicitly, as sigmodonts. These dental specializations may have developed more than once and the phylogenetic relationships of these rodents remains unclear. *Holochilus* was "placed in an oryzomyine group" by Steppan (1993: 202) and not judged to be closely related to *Neotomys*. Whether by "an oryzomyine group" he meant the tribe Oryzomyini he did not explicitly state. The existence of a "*Reithrodon* group," including *Reithrodon*, *Neotomys*, and *Euneomys*, as suggested earlier by Olds and Anderson (1990), was supported by Steppan's results. *Holochilus* "*brasiliensis*" was used as an "out-group" in an electrophoretic study of proteins in 14 species of oryzomyine rodents by Dickerman and Yates (1995: 188).

Holochilus sciureus Wagner, 1842

Marsh Rat, Rata Nutria, Rata Colorada

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Mus brasiliensis* was described by Desmarest (1819: 62); type locality "Brésil" restricted to Lagoa Santa, Minas Gerais, by Hershkovitz (1955: 662). *Holochilus sciureus* was described by Wagner (1842a: 16), type locality Rio São Francisco, Minas Gerais, Brazil. *Holochilus amazonicus* was described by Osgood (1915: 188), type locality Itacoatiara, state of Amazonas, Brazil.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of specimens from near Tita (AM 260766–260771, MSB 55299–55300).

DISTRIBUTIONAL NOTES: All of the known localities are in the lowlands, below 500 m elevation. These are listed below and mapped in figure 753.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

PARASITOLOGY: Brennan (1970: 810) reported three species of chiggers, *Eutrombi-*

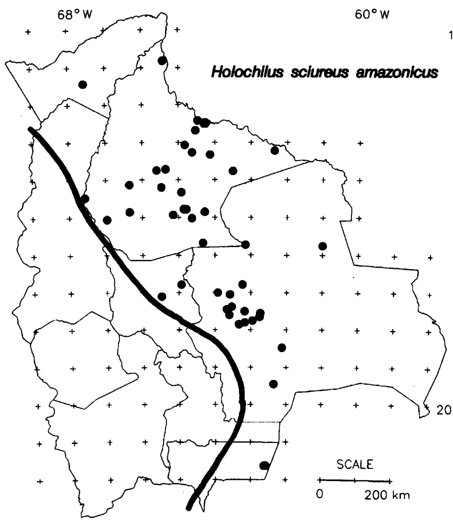


Fig. 753. Localities of known occurrence of *Holochilus sciureus amazonicus*.

cula alfreddugesi from the mouth of the Baures River, *E. jellisoni* from opposite Costa Marques, and *E. batatas* from the mouth of the Baures River, from opposite Costa Marques, and from Pampa de Meio.

REPRODUCTION: Young individuals were taken in April (2), May (2), and October (1, 62 g). A lactating female was taken in March. Nonpregnant females were recorded in May (5), September (7), and October (6).

Scientific synonyms used for Bolivian specimens are:

Holochilus sciureus amazonicus
Osgood, 1915

Holochilus brasiliensis amazonicus: Hershkovitz, 1955: 668 (Marbán, Buenavista). Anderson, 1985b: 13 (name in list). Anderson, 1993: 41 (general distributional records). Anderson et al., 1993: 46 (vicinity of Santa Cruz de la Sierra).

Holochilus brasiliensis: Brennan, 1970: 810 (chiggers, noted under Parasitology above). Dickerman and Yates, 1995: 188 (1739/6245, 1828/6207). Steppan, 1995: 108 (AM 210218–210223, mouth of río Baures).

Holochilus sciureus: Nowak and Paradiso, 1983: 611 (Bolivia). Musser and Carleton *in* Wilson and Reeder, 1993: 705, following Massoia, 1980b, 1981.

LOCALITIES (49) AND SPECIMENS (263): **Beni:** 1049/6525, Guayaramerin, on opposite bank of río Mamoré (on island?), 5 AM; 1225/6428, bank of río Iténez opposite Principe da Beira [Brazil], 1 AM; 1229/6415, río Iténez, 4 km above Costa Marques [Brazil], 1 AM; 1229/6417, bank of río Iténez opposite Costa Marques [Brazil], 5 AM; 1230/6415, Pampa de Meio, 10 AM; 1230/6418, mouth of río Baures, 48 AM; 1241/6432, 15 km above Horquilla on río Machupo, 9 AM; 1304/6449, San Joaquín, 29 FM, 23 US; 1313/6221, 20 km W Larangeira, Bahía de los Casara, 15 AM; 1316/6437, San Ramón, 4 MSB; 1320/6408, Magdalena, 2 US; 1343/6521, Puerto Caballo on río Mamoré, 7 AM; 1345/6536, Santa Ana, 1 FM; 1346/6330, Lago Victoria, 5 US; 1408/6621, Espíritu, 9 IE; 1412/6528, Fortaleza, province of Yacuma, 1 US; 1420/6455, 10 km W San Pedro, 1 AM; 1428/6734, Rurrenabaque, 1 IE; 1446/6451, río Ibare, 24 km from mouth, 1 AM; 1447/6447, Trinidad, 15 CBF (owl pellets); 1447/6451, Puerto Almacen, 2 AM; 1451/6417, río Matos, 6 km E of Estación Biológica del Beni, 1 AM; 1451/6621, Totaisal, 1 km SW of Estación Biológica del Beni, 1 MSB; 1456/6509, río Tijamuchi, 2 AM, 3 MSB; 1501/6438, San Lorenzo, 1 MNLP; 1503/6658, 1 km E of La Embocada, 1 UMMZ; 1540/6420, río Mamoré in province of Marbán, 2 MAHN (Hershkovitz, 1955), 2 MACN (not examined). **Cochabamba:** 1647/6456, Campamento Yuquí, 2 CBF; 1706/6529, Palmar, 1 MACN (not examined). **Pando:** 1126/6734, Independencia, 1 AM. **Santa Cruz:** 1543/6309, 6 km by road W of Ascención, 2 AM, 1 MSB; 1545/6100, Los Palmares, 1 MNK; 1647/6314, Estancia Cachuela Esperanza, 2 AM, 1 MSB; 1700/6355, Ayacucho, 2 AM, 1 CENETROP; 1703/6335, 7 km N Santa Rosa, 3 AM; 1723/6332, San Miguel Rincón, 1 AM; 1727/6340, Buenavista, 13 BM, 1 FM; 1730/6310, Warnes, province of Warnes, 1 US; 1733/6244, 8 km N and 1 km E of Pailón, 2 MNK; 1736/6336, San Rafael de Amboró, 1 MSB; 1739/6245, 3.5 km W of Estación Pailón, 2 MSB; 1745/6257, Cotoca, 1 AM, + other owl pellet material in collection in La Paz; 1748/6310, Santa Cruz de la Sierra, 1 AM, + 2 from other owl pellets in collection in La Paz, 1 CM; 1751/6320, Ayacucho, province of Ibáñez, 1 US; 1828/6207, 8 km SE of Tita, 6 AM, 2 MSB; 1927/6221, Cerro

Colorado, 1 EBD; coordinates uncertain, Uruma, 1 MACN (not examined). **Tarija:** 2138/6234, Estancia Bolívar, 1 AM; 2138/6237, 5 km W of Estancia Bolívar, 1 CBF.

TRIBE ICHTHYOMYINI VORONTSOV, 1959

TAXONOMIC REMARKS: Voss (1988), the most recent reviser of the group, provided the first adequate diagnosis for the tribe.

Genus *Chibchanomys* Voss, 1988

TAXONOMIC REMARKS: Voss (1988: 325) knew of only eight specimens of this genus. They were all referred to the species *C. trichotis*.

Chibchanomys, not yet identified

TAXONOMIC REMARKS: Considering the limited number of specimens of *C. trichotis* that were available and their scattered distribution in three countries, the possible limits of variation in the species can be estimated only roughly and the possibility of significant geographic variation cannot be measured. Thus, study of the single new and immature Bolivian specimen (TLY 1519) remains to be completed.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 20 are of the one specimen, a young adult.

DISTRIBUTIONAL NOTES: Known only from 2163 m elevation in the Zongo Valley. Mapped in figure 754.

HABITAT: Trapped near a small stream.

No data are available on habits, behavior, food, or reproduction.

LOCALITY (1) AND SPECIMEN (1): **La Paz:** 1607/6805, 0.5 km E of Saynani, río Zongo, 1 CBF.

Unidentified Muridae

LOCALITIES (8) AND SPECIMENS (31): **Chuquisaca:** 2056/6321, 2 km S and 10 km E of Tiquipa, Laguna Palmer, 4 AM. **Cochabamba:** 1717/6513, río Yanimayo, 35 km N of Monte Punco, 3 IML, "rata"; 1742/6442, San Mateo, 1 IML; 1748/6445, 101 km by road SE of Epizana, Siberia Cloud Forest, 1 AM. **Oruro:** 1742/6730, 12 km S and 1.6 km E of Eucaliptus, 1 AM. **Santa Cruz:** 1703/6335, 7 km N of Santa Rosa, 5 IML; 1810/6336, Vermejo, 8 AM. **Tarija:** 2119/6325, 8 km S and 10 km E of Villa Montes, 7 AM. **Department unknown:** "Bolivia" only, 1 AM (246876).

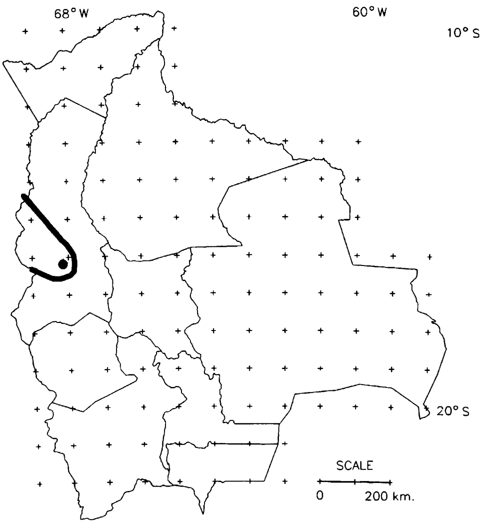


Fig. 754. Locality of known occurrence of *Chibchanomys* (not identified to species).

SUBORDER HYSTRICOGNATHI

There are 18 living families, 12 of which occur in South America and in Bolivia.

External dimensions that were measured are noted under Rodentia above. Cranial measurements, taken with hand-held calipers and recorded to the nearest tenth of a millimeter, are condylobasilar length, condyloincisive length, palatilar length, alveolar length of molariform tooth row, minimum palatal breadth between alveoli of left and right teeth, dental span (maximum breadth across maxillary dentition), zygomatic breadth, lambdoidal breadth, interorbital breadth, and heighth of skull from occlusal plane to highest point dorsal to teeth, occipitonasal length, interorbital breadth, postorbital breadth, braincase breadth, and alveolar maxillary tooth row length. Measurements taken as described by Anderson (1972: 268).

FAMILY ERETHIZONTIDAE BONAPARTE, 1845

Genus *Coendou* Lacépède, 1799

Prehensile-tailed Porcupine, Puerco Espino

Coendou bicolor (Tschudi), 1845

TAXONOMIC REMARKS: One name used for Bolivian specimens has its type locality out-

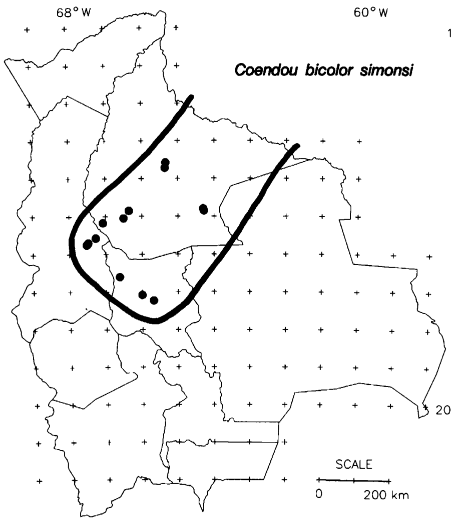


Fig. 755. Localities of known occurrence of *Coendou bicolor simonsi.*

side of Bolivia. *Sphingurus bicolor* was described by Tschudi (1845: 186, pl. 15), type locality between Tulumayo and Chanchamayo Rivers, Junín Department, Peru.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from 1335/6520 (AM 214610, 214611, 214612).

DISTRIBUTIONAL NOTES: Occurs in the lowlands of Beni and up to 2500 m elevation in the Yungas (Incachaca) of Cochabamba. Known localities are listed below and mapped in figure 755.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: A female with one embryo was taken in July.

Scientific synonyms used for Bolivian specimens are:

Coendou bicolor simonsi Thomas, 1902

Coendou simonsi Thomas, 1902a: 141 (type locality Charuplaya, department of Cochabamba, Bolivia).

Coendou Simonsi: Neveu-Lemaire and Grandidier, 1911: 15.

Coendou bicolor simonsi: Ellerman, 1940: 187. Anderson, 1985b: 15 (name in list). Glanz and Anderson, 1990: 31 (Palos Blancos, cited erroneously as from Cochabamba). Anderson, 1993: 44 (general distributional records). Timm and Price, 1994: 13 (new species of louse *Eutrichophilus andersoni* from Puerto Caballo).

Coendou bicolor: Biknevicius, 1993: 96 (functional anatomy, AMNH 214610, 214611).

LOCALITIES (13) AND SPECIMENS (16): **Beni:** 1335/6520, río Mamoré, 3 AM; 1343/6521, Puerto Caballo, 1 AM; 1448/6418, Ibiato, 1 CBF; 1451/6621, "San Borja" La Cabaña, 1 EBD; 1451/6417, río Matos, 6 km E of Estación Biológica del Beni, 1 AM?; 1503/6630, Aserradero Triunfo, 28 km E and 20 km S of San Borja, 1 EBD; 1510/6704, Yucumo, 2 AM. **Cochabamba:** 1636/6637, Charuplaya, 1 BM; 1705/6600, Tablas Monte, 1 CBF; 1714/6541, Incachaca, 1 CM. **La Paz:** 1534/6716, Palos Blancos, 1 AM; 1542/6729, Serranía Bella Vista, 1300 m, 1 CBF; 1545/6731, 1 km S of La Reserva, 1 CBF.

Coendou prehensilis (Linnaeus, 1758)

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Hystrix prehensilis* was described by Linnaeus (1758: 57); type locality "Asia, America *meridionali*," by implication restricted by Ellerman (1940: 186) to "probably near Pernambuco," Brazil. *Hystrix Brandtii* was described by Jentink (1879: 96); type locality restricted by Thomas (1904a: 240) to "Matto Grosso, Brazil."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from 1312/6515 (AM 214613, 214614), 1727/6340 (ANSP 14273, BM 34.9.2.178, and 34.9.2.179). Data for specimens from Ibiato in table 15 are from W. Townsend (in litt.).

PARASITOLOGY: *Trypanosoma* was reported by Valette et al. (1988). Leishmaniasis was reported in this species by Le Pont et al. (1989).

DISTRIBUTIONAL NOTES: Widely distributed in the lowlands below 500 m elevation. One record is at 700 m (near Santiago de Chiquitos). Known localities are listed below and mapped in figure 756.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

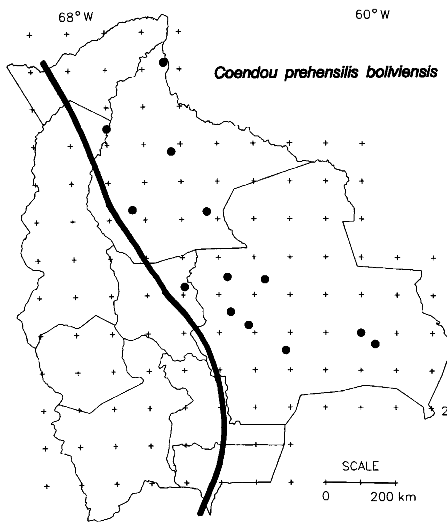


Fig. 756. Localities of known occurrence of *Coendou prehensilis boliviensis.*

Coendou prehensilis boliviensis Gray, 1850

Cercolabes prehensilis: Waterhouse, 1848: 411 (Santa Cruz de la Sierra).

Coendou boliviensis Gray, 1850b: 380 (type locality "Bolivia").

Cercolabes boliviensis: Gerrard, 1862: 192 (one from Bolivia).

Coendu prehensilis: Krieg, 1929b: 774 (Chiquitos). Arce Pereira et al., 1963: 151 (generic name misspelled in list; Todos Santos, río Chapare).

Coendou prehensilis boliviensis: Ellerman, 1940: 186 (skull illustrated on pp. 183 and 184). Cabrera 1961a: 599. Crespo, 1974: 29 (Santa Cruz de la Sierra). Anderson, 1985b: 15 (name in list). Anderson, 1993: 44 (general distributional records). Anderson et al., 1993: 49 (vicinity of Santa Cruz de la Sierra).

Coendou brandti: Krumbiegel, 1942a: 18 (Chiquitos).

Coendou prehensilis platycentrotus: Crespo, 1974: 29 (Buenavista).

Coendou prehensilis: Tello, 1986: 20 (Piedras Blancas, remains in ocelot stomach). Valette et al., 1988: 139 (hosts of *Trypanosoma* sp? from Yungas of La Paz). Le Pont et al., 1989: 575 (hosts of *Leishmania chagasi*). Eisenberg, 1989: 391 (mentioned Bolivia). Emmons and Feer, 1990: 197 (mentioned Bolivia). Biknevicius, 1993: 96 (functional anatomy, AMNH 214613, 214614). Parker et al., 1993: 103 (reported by local people from Curuyuqui and Perforación).

Coendu spp.: Stearman, 1990: 380 (Yuqui camp at 1647/6457).

LOCALITIES (14) AND SPECIMENS (50): **Beni:** 1049/6525, near Guayaramerin, 1 AM; 1312/6515, 8 km N Exaltación, 2 AM; 1444/6621, 7 km NW of Trapiche, 1 MNLP; 1448/6418, Ibiato, 6 CBF, 10 MNK (+ 4, W. Townsend, in litt.). **Cochabamba:** 1647/6457, Campamento Yuquí, 1 MNLP. **La Paz:** 1234/6700, río Madidi, 8 km from mouth, 1 MSB. **Santa Cruz:** 1632/6345, río Piray, 1 AM; 1636/6242, 10 km N of San Ramón, 1 AM; 1727/6340, Buenavista, 1 ANSP, 5 BM, 1 FM, 4 MACN; coordinates uncertain, río Saguayo, 1 MNK; 1748/6310, Santa Cruz de la Sierra, 1 BM; 1800/6000, Chiquitos, 4 ZSM (Krumbiegel, 1942); 1818/5936, 4 km N and 1 km W of Santiago de Chiquitos, 1 AM; 1828/6207, 8 km SE of Tita, 1 AM. **Department unknown:** perhaps Bolivia, 1 MNLP; "Bolivia," 1 BM, 1 MACN.

Coendou, species not determined

LOCALITIES (4) AND SPECIMENS (5): **Beni:** 1448/6418, Ibiato, 1 CBF; coordinates uncertain, Villa Mar, adelante de Villa Mari, Santa Teresita, 1 CBF. **Cochabamba:** 1643/6449, río Chimoré, 2 CBF; 1647/6457, Campamento Yuqui, 1 MNLP.

FAMILY CHINCHILLIDAE BENNETT, 1833

Only one Bolivian chinchillid, *Chinchilla chinchilla*, is listed as endangered or threatened under CITES.

Genus *Chinchilla* Bennett, 1830

Chinchilla chinchilla Lichtenstein, 1830

Chinchilla

TAXONOMIC REMARKS: Opinions differ on several biological and nomenclatorial questions. The major biological question is the number of species of chinchillas to be recognized: one (Bennett, 1829; Osgood, 1941; Allen, 1943), two (Cabrera, 1961; Corbet and Hill, 1980; Woods *in* Wilson and Reeder, 1993), or three (Prell, 1934; Bidlingmaier, 1937). No convincing case, based on adequately documented specimens of known provenance, has been made for more than one species. Geographic variation exists (or existed prior to extinction over most of the range of the species) and was known in a general way to the fur trade. Pelts from higher and colder regions had longer, finer, warmer fur, probably were larger, and the animals may have had shorter tails and ears. However, variation is so poorly known that the use of subspecies seems more confusing than clarifying and, to me, does not seem to be warranted.

In regard to nomenclature, some authors (e.g., Cabrera, 1961; Corbet and Hill, 1980; Woods *in* Wilson and Reeder, 1993) have been willing to use *Mus laniger* Molina (1782: 301) in the form *Chinchilla lanigera*, even though the description was written with no specimen in hand and is ambiguous at best. Other authors (e.g., Prell, 1934a, 1934b; Osgood, 1941; and Allen, 1942) have considered the problem in detail and have rejected Molina's name as ambiguous, unidentifiable, or even applicable to a different animal, of the genus *Abrocoma*. Incidentally, the acceptance of this latter interpretation would alter the nomenclature of that genus because *laniger*, 1782, is an older name than names now used for species of *Abrocoma*.

If Molina's *laniger* is rejected as a dubious name, of uncertain synonymy, what is the correct name? The first adequate description of the chinchilla based on specimens was by Bennett (1830: 1). He proposed the genus *Chinchilla* and used Molina's specific epithet, merely adding the letter "a" to conform to the gender of the new generic name. Subsequently he proposed the family Chinchillidae (Bennett, 1833, 1835a). Most names used for Bolivian specimens have type localities outside of Bolivia. Lichtenstein (1830: plate 28) proposed *Eriomys chinchilla*. The type locality of Lichtenstein's name was said to be Peru (Prell, 1934: 102; Osgood, 1941: 410) or to be uncertain but perhaps Chile (Allen, 1942: 391). The name *Cricetus chincilla* (sic) had been used by Fischer (1814: 55) as a renaming of Molina's *laniger*. The general taxonomic confusion that prevailed for decades is reflected in the use of seven different generic names for chinchillas (Cabrera, 1961: 566). *Chinchilla brevicaudata* was described by Waterhouse (1848: 241), type locality Peru. Only 12 specimens are available now to support our scanty knowledge of "Bolivian" chinchillas.

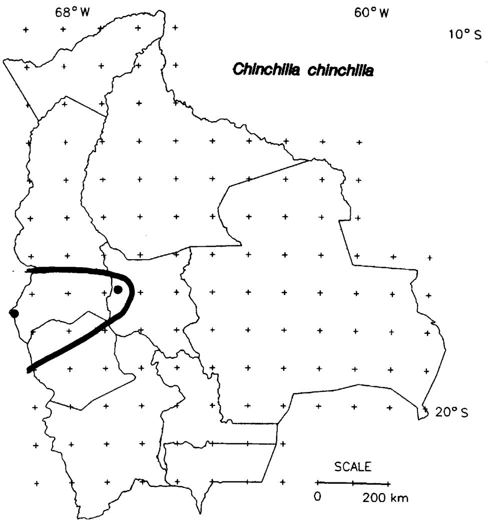


Fig. 757. Localities of known occurrence of *Chinchilla chinchilla*.

Morphological Characters and Comparisons: Measurements in tables 18 and 21 are of specimens from the Cordillera de Ascotán (BM 98.1.8.17, 98.8.2.7, and 98.8.2.10).

Distributional Notes: The chinchilla was native to the provinces of Lipez and Porco in the Department of Potosí (Chacón, 1892: 207). The chinchilla was "fairly common in the departments of La Paz, Oruro, and Potosí, but to-day its numbers have sensibly decreased" (Walle, 1914: 370). They "inhabit the Cordillera, but do not frequent the higher altitudes," and "the extinction of the species will only be a matter of time if measures are not taken to preserve it." Known localities are listed below and mapped in figure 757.

No original observations in Bolivia on habitat, habits, behavior, food, or reproduction have been published.

Conservation Status: Regarded as endangered (CITES, Appendix I). Now, the species may be extinct in Bolivia. The most recent specimen is one from near Chaquecamata taken in 1939.

Scientific synonyms relevant to Bolivian specimens are:

Chinchilla lanigera: Waterhouse, 1848: 238 ("Mr. Bridges met with the species . . . both on the Bolivian and Chilian sides of the Cordillera"). Anderson, 1985b: 14 (name in list). Anderson, 1993: 43 (general distributional records). Yensen and Tarifa, 1993: 59 (brief discussion of status).

Callomys laniger: d'Orbigny and I. Geoffroy Saint-Hilaire, 1830: 291 (name combination, no specific reference to Bolivia as such).

Chinchilla brevicaudata: Neveu-Lemaire and Grandidier, 1911: 16 (Bolivian Andes). Woods *in* Wilson and Reeder, 1993: 777 ("S Bolivia," did not cite Allen, 1942). Rubio et al., 1991: 40 (mention highlands of southern Bolivia).

Eriomys chinchilla: Créqui Montfort and Sénéchal de la Grange, 1904: 97 ("le chinchilla vulgaire," no specimen mentioned).

Eriomys laniger: Créqui Montfort and Sénéchal de la Grange, 1904: 97 ("le chinchilla laineux," no specimen mentioned).

Ch[*inchilla*]. *boliviana* Brass, 1911: 613 (Bolivia and Chile, type locality Bolivia, by inference). Prell, 1934: 101.

Chinchilla boliviana: Prell, 1934: 101.

Chinchilla intermedia Dennler, 1939: 95 (paper not seen and type locality not known to me; cited by Cabrera, 1961a: 567).

Chinchilla lanigera boliviana: Allen, 1942: 389. Suárez Morales, 1986: 62 (status of names).

Chinchilla brevicaudata boliviana: Cabrera, 1961a: 567 (Andes of southern Bolivia). Nowak and Paradiso, 1983: 822.

LOCALITIES (AT LEAST 3) AND SPECIMENS (12): **Cochabamba:** 1655/6637, mountains near Chaquecamata (coordinates uncertain), 1 MVZ. **La Paz:** 1730/6930, Chile at border with Bolivia and Peru, 3 Frankfurt (Felten, in litt.). **Department unknown:** "Bolivia," 1 BM, 1 MACN (not examined); "Bolivian frontier," 1 BM; coordinates uncertain, "Cordillera de Ascotán, frontier of Bolivia," 5 BM.

Genus *Lagidium* Meyen, 1833

Lagidium viscacia (Molina, 1782)

Mountain Viscacha, Vizcacha, Chinchillon del Altiplano

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Lepus viscacia* was described by Molina (1782: 307); type locality Andes of Chile restricted by Osgood (1943: 137) to the cordillera of Santiago. *Lagotis cuvieri* was described by Bennett (1833: 59); type locality "Peruviani" restricted to Tarapacá, Chile, by Osgood, 1943, based on data from Thomas. *Lagidium peruanum* was described by Meyen (1833: 578), type locality southern Peru. *Lagotis pallipes* was described by Bennett (1835c: 67), type locality "Chiliae montosis" or Chilian Andes. *Lagidium vulcani* was described by Thomas (1919c: 133), type locality "Cerro Casabindo, 4800 m." in province of Jujuy, Argentina.

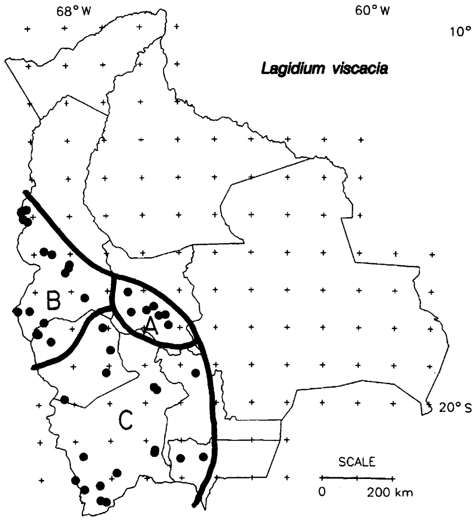


Fig. 758. Localities of known occurrence of three subspecies of *Lagidium viscacia*, *L. v. cuscus* (A), *L. v. cuvieri* (B), and *L. v. perlutea* (C).

DISTRIBUTIONAL NOTES: Generally inhabit high rocky areas, ranging from elevation 2500 m (Chiyijte) to at least 5100 m (Ulla Ulla). Known localities are listed below and mapped in figure 758.

No original observations in Bolivia on habitat, habits, behavior, or food are available.

PARASITOLOGY: A nematode parasite, *Helminthoxys velize* Quentin (1973: 1074), was named from "Suche, region de Ulla Ulla, departement de La Paz." It was subsequently (Hugot and Sutton, 1989: 393) regarded as a synonym of *H. effilatus*. Fonseca (1960: 92, 129) reported *Ornithodoros* (a tick, Argasidae) and *Bdellonyssus viscaccia* (Macronyssidae) from *Lagidium viscaccia* from Monos (at elevation 1434 m, presumably at 1844/6354, in Santa Cruz). I know of no other record of *L. viscacia* in this department, and I have not seen a voucher specimen for the host. Fonseca (1960: 132, 134) also reported *Schoengastia* (*Euschoengastia*) *audyi* and *Tragardhula traubi*, both trombiculid mites, from Monos. The flea, *Ectinorus* (*Ectinorus*) *simonsi* was reported from Zudañez [1905/6445] by Smit (1987: 106).

REPRODUCTION: One female taken in November had one fetus. Young were recorded in April (1), November (2), and December (1).

Scientific synonyms for subspecies recognized in Bolivia are given below.

Lagidium viscacia cuscus (Thomas, 1907)

Lagidium peruanum: Thomas, 1902a: 142 (Paratani). Neveu-Lemaire and Grandidier, 1911: 16 (Paratani). Krumbiegel, 1940d: 110 (Paratani).

Viscaccia cuscus Thomas, 1907a: 443 (type locality "Paratani, Bolivia (about 66° W., 17° 5′ S.). Alt. 2600 m." in the department of Cochabamba. Neveu-Lemaire, 1911: 15 [Paratani]).

Lagidium viscaccia cuscus: Ellerman, 1940: 231 (use of name combination). Suárez Morales, 1986: 39 (undocumented name in list). Glanz and Anderson, 1990: 31.

Lagidium viscacia cuscus: Cabrera, 1961a: 563 (use of Molina's original spelling of *viscacia*). Suárez Morales, 1986: 55 (undocumented name in list). Anderson, 1993: 43 (general distributional records).

Lagidium vicaccia cuscus: Anderson, 1985b: 14 (name in list). Suárez Morales, 1986: 74 (name in list).

Lagidium vicaccia: Miralles and Salazar, "1990": 9 (name in list, subspecies not specified).

LOCALITIES (8) AND SPECIMENS (15): **Cochabamba:** 1702/6626, Altamachi, 2 US (not seen); 1725/6543, Tiraque, Cerro Juno, 4 BM, 2 FM; 1731/6555, Cerro San Benito, 1 BM; 1734/6621, Paratani, 1 BM; 1740/6535, 9.5 km by road SE of Rodeo, then 2.5 km on road to ENTEL antenna, 1 AM; 1739/6524, Pocona, 1 BM; 1756/6519, Mizque, 1 AM; coordinates uncertain, Chiyijte, 2 FM.

The published reports cited in the synonymy are all based on one specimen from Paratani.

Measurements in tables 18 and 21 are of specimens from 1756/6519 (AM 38981), Chiyijte (FM 31671, 31672), 1731/6555 (BM 34.9.2.101), and 1731/6555 (BM 34.9.2.101).

Lagidium viscacia cuvieri (Bennett, 1833)

Lagotis Cuvieri: Bridges, 1846: 7 ("Bolivia ... 10,000 to 12,000 feet").

Lagidium Cuvieri: Waterhouse, 1848: 225 ("to the west of La Paz, on the east side of the Andes").

Lagidium pallipes: Waterhouse, 1848: 230 ("neighborhood of La Paz, at an elevation of about twelve thousand feet"). Neveu-Lemaire and Grandidier, 1911: 16 (La Paz). Krumbiegel, 1940d: 110 (La Paz, Sahama).

Lagidium peruanum: Thomas, 1898a: 278 (Esperanza). Quentin, 1973: 1074 (nematode parasite from Suche).

Viscaccia lutea Thomas, 1907a: 443 (type locality "Esperanza, [near Mt.] Sahama, Bolivia"). Neveu-Lemaire and Grandidier, 1911: 15 (Esperanza).

Viscaccia pallipes: Neveu-Lemaire and Grandidier, 1911: 15 (La Paz).

Lagidium viscacia cuvieri: Cabrera, 1961a: 563 (use of name combination). Anderson, 1993: 43 (general distributional records). Yensen and Tarifa, 1993: 58 (Quebrada Kohuiri and Cerro Huincurata).

Lagidium viscaccia: Rowlands, 1974: 133 (photograph taken near Ulla Ulla). Ergueta and Salazar, 1991: 40 (general summary, map).

Lagidium vicaccia cuvieri; Anderson, 1985b: 14 (name in list).

Lagidium viscacia: Mercado and Miralles, 1991: 295 (La Paz Valley). Durden and Musser, 1994: 58 (the sucking louse, *Lagidiophthirus parvus*, recorded from La Paz).

LOCALITIES (21) AND SPECIMENS (65): **La Paz:** 1448/6910, 1 km W of pass between Antoquilla and Pelechuco, 2 MVZ; 1449/6916, Lago Katantica, Ulla Ulla, 6 EBD; 1452/6919, Lago Cololo, 2 IE; 1503/6916, Ulla Ulla, (photograph only, Rowlands, 1974); 1 MNLP; 1507/6909, Laguna Saracoche, Ulla Ulla, 1 EBD; 1555/6843, 10 to 15 mi [= 16 to 24 km] N Achacachi, province of Umasuyos, 2 US; 1600/6830, Titicaca Lake, 2 Frankfurt (Felten, in litt.); 1617/6802, Alaska Mine, 2 AM; 1622/6803, La Cumbre, 2 ANSP; 1630/6809, west of La Paz, on the east side of the Andes, 1 BM; 1630/6809, La Paz, 3 MACN (not examined); 1630/6809, Cordilleras of La Paz, 1 ANSP; 1630/6809, neighborhood of La Paz, 1 BM (Waterhouse, 1848); 1710/6738, Salla, 1 MNLP; 1730/6910, Estación Pérez, province of Pacajes, 8 FM; 1730/6930, Chile at border to Bolivia and Peru, 2 Frankfurt (Felten, in litt.); 1749/6847, Esperanza, 4 BM, 13 FM, 1 US; coordinates uncertain, Pacajes [province of], 2 MACN (not examined). **Oruro:** 1807/6900, Sajama, 2 BM; 1808/6857, Parque Nacional Sajama, 2 CBF; 1820/6836, Estancia Agua Rica, 40 km E and 22 km S of Sajama, 1 AM, 1 MSB. **Department unknown:** coordinates uncertain, "presented by J. B. Pentland, Consul-General in Bolivia," 1 BM (Flower, 1884); "Bolivia," 1 MACN (not examined).

Measurements in tables 18 and 21 are of specimens from Estación Pérez (FM 4 M, 4 F, including FM 53673, 53678), and 1448/6910 (MVZ 164778, 164779).

Lagidium viscacia perlutea Thomas, 1907

Lagidium Cuvieri: Waterhouse, 1848: 225 (vicinity of Potosí).

Lagidium sp.: Thomas, 1902b: 229 (Potosí).

Viscaccia perlutea Thomas, 1907a: 443 (type locality "Pampa Aulliaga, Bolivia (67° W., 19° 30′ S.). Alt. 3800 m."). Neveu-Lemaire and Grandidier, 1911: 15 (Pampa Aullaga).

Lagidium vulcani: Thomas, 1926d: 195 (Lipez); 1926b: 326 (Sama, Tambo).

Lagidium peruanum: Krumbiegel, 1940d: 110 (Tambo).

Lagidium vicaccia vulcani: Anderson, 1985b: 14 (name in list).

Lagidium vicaccia: Salazar, 1990: 195 (observations in Reserva "Eduardo Abaroa").

Lagidium vulcnai: Woods *in* Wilson and Reeder, 1993: 778 (misspelling in synonymy).

Lagidium viscacia vulcani: Anderson, 1993: 43 (general distributional records).

Lagidium viscacia: Ibáñez *in* Alzerreca et al., 1982: 62 (southern Potosí).

LOCALITIES (18) AND SPECIMENS (58): **Chuquisaca:** 1913/6434, 6 mi [= 9.7 km] NW Tarabuquillo, 1 CAS. **Oruro:** 1759/6709, Oruro, 2 CM; 1835/6657, Callipampa, 1 ANSP; 1911/6705, Pampa Aullaga, 2 BM (Thomas, 1907; one seen). **Potosí:** 1935/6545, vicinity of Potosí, 4 BM; 1939/6540, Caricari Mountains, 4 ANSP; 1952/6816, Llica, province of Nor Lipez, 2 ANSP; 2115/6545, Chocaya, 2 ANSP; 2119/6546, Oploca, Finca Salo, 4 ANSP; 2124/6747, 9 km W of Villa Alota, 3 EBD; 2151/6651, Lipez, 2 BM; 2201/6802, Silala, near province of Antofagasta, Chile, 4 FM; 2211/6720, río Quetena, Quetena Chica, 5 EBD; 2217/6747, Laguna Colorado, 2 AM, 8 EBD; 2235/6720, Pampa de Inca, Laguna Totoral, 1 EBD; 2237/6710, Laguna Busch or Kalina, 2 EBD. **Tarija:** 2127/6423, Tambo, 5 BM; 2129/6502, Sama, 4 BM.

Measurements in tables 18 and 21 are of specimens from Oploca (ANSP 18204, 19423–19425).

Genus *Lagostomus* Brookes, 1828

The skull of an animal named *Lagostomus crassus* (by Thomas 1910a: 246) was obtained "by Mr. Kalinowski, by whom it was found buried in sand" at "Santa Ana, District of Cuzco, Peru." Thomas noted that "the skull is in no way fossilized, and indicates that these animals lived in Peru at a very recent date." This place is about 1000 km from the nearest known occurrence in southeastern Bolivia of *Lagostomus* of the living species, *L. maximus*.

Lagostomus maximus (Desmarest, 1817)

Plains Viscacha, Viscacha de las Pampas

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Dipus maximus* was described by Desmarest (1817: 117), type locality unknown, perhaps pampas near Buenos Aires. *Lagostomus maximus inmollis* was described by Thomas (1910a: 245), type locality "Tapia, Tucuman. Alt. 700 m." in Argentina. Créqui Monfort and Sénéchal de la Grange (1904: 97) used the name *Lagostomus trichodactylus* for the "viscacha" in Bolivia, but no specific locality was given and no specimen was mentioned.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from 2058/6251 (LACM 27363, 27362, and 62832).

DISTRIBUTIONAL NOTES: Occupies lowlands (below 600 m elevation) in the Chaco of Bolivia. Known localities are listed below and mapped in figure 759.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

PARASITOLOGY: Fonseca (1960: 93) reported a tick (Ixodidae, genus *Amblyomma*) from *Lagostomus maximus* from Cabezas (1846/6324, in Santa Cruz). I have not seen a voucher specimen for the host.

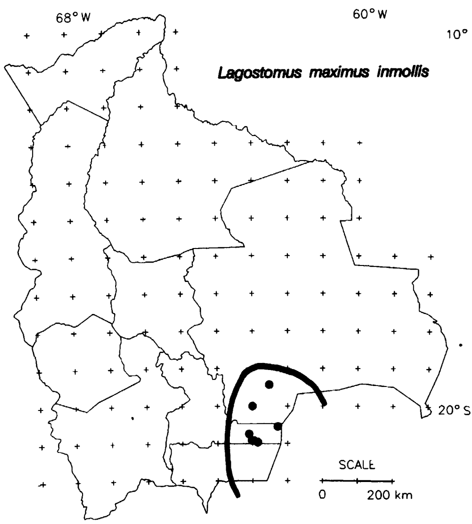


Fig. 759. Localities of known occurrence of *Lagostomus maximus inmollis.*

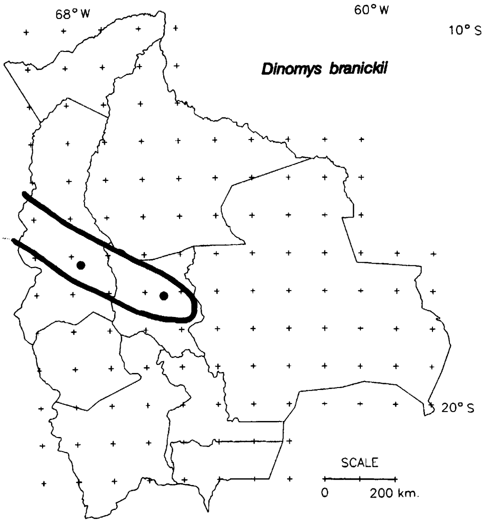


Fig. 760. Localities of known occurrence of *Dinomys branickii.*

Reproduction: A female with two embryos was recorded in February.

Scientific synonyms used for Bolivian specimens are:

Lagostomus maximus inmollis Thomas, 1910

Lagostomus maximus inmollis: Anderson, 1985b: 14 (name in list). Anderson, 1993: 42 (general distributional records).

Viscacia viscacia: Krieg, 1929b: 772 (in the drier western Chaco, north of the río Pilcomayo, one could see dozens of burrows in a single day). Eisentraut, 1933: 57 (observations near Palo Marcado and Samuhuate in the Chaco of Tarija, sketch of tunnel system).

Lagostomus maximus: Fonseca, 1960: 93 (ectoparasites from Cabezas). Eisentraut, 1983: 33, 108 (observations at Palo Marcado, Tarija). Glanz and Anderson, 1990: 31. Ergueta and Salazar, 1991: 39 (general summary). Parker et al., 1993: 102 (Perforaci6n).

Localities (7) and Specimens (16): **Chuquisaca:** 2033/6217, 1 km W of Sargento Rodriguez [Paraguay], in Bolivia, 1 UCONN (R. M. Wetzel, personal commun.); 2045/6306, 4.5 km by road W of Carandayti, 4 AM, 1 MSB; 2055/6301, 50.4 km by road E Tiquipa, 1 AM; 2055/6258, 55.2 km by road E Tiquipa, 1 AM; 2058/6251, 30 km SE Carandaiti, 3 LACM. **Santa Cruz:** 1926/6231, Com. Guirapembi, 2 EBD; 2000/6300, Parapeti, 1 BM. **Department unknown:** "Bolivia" only, 2 Frankfurt (Felten, in litt.).

FAMILY DINOMYIDAE TROSCHEL, 1874

Genus *Dinomys* Peters, 1873

Dinomys branickii Peters, 1873

Pacarana

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Dinomys branickii* was described by Peters (1873: 552), type locality "Peru" or Amable Maria, Vitoc Mountain, department of Junín, Peru.

Morphological Characters and Comparisons: Measurements in tables 18 and 21 are of specimens from a zoo (AM 185372, 183828) and El Palmar (MACN 12961).

Distributional Notes: Known from only two Bolivian localities, in the Yungas at about 1600 m elevation. Known localities are listed below and mapped in figure 760.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Parasites: White and Alberico (1992: 3) cited the presence of ascarids and strongyles in a captive animal said to be from Santa Cruz. The worms were noted during necropsy but were not preserved (Dennis A. Meritt, Jr., in litt.).

Reproduction: A young individual (head and body length of 260 mm) was taken in June.

Conservation Status: Not listed under CITES as endangered or threatened, but listed by IUCN as endangered. Not common in Bolivia.

Scientific synonym used for Bolivian specimens is:

Dinomys branickii: Crespo, 1959: 11 (El Palmar). Anderson, 1985b: 15 (name in list). Emmons and Feer, 1990: 206 (mentioned Bolivia). Ergueta and Salazar, 1991: 40 (general summary). White and Alberico, 1992: 1 (summary of species). Anderson, 1993: 44 (general distributional records).

Localities (2) and Specimens (3): **Cochabamba:** 1706/6529, El Palmar, province of Chapare, 2 MACN. **La Paz:** 1614/6745, Yolocita, 1 MNLP.

FAMILY CAVIIDAE GRAY, 1821

Taxonomic Remarks: Gray and Gray (1847: 46) reported a specimen from "Bolivia" in the Bridges's collection as "Kerodon Kingii," so it is probably a caviid, but beyond that its identity is uncertain.

No Bolivian caviid is listed under CITES as endangered or threatened.

SUBFAMILY CAVIINAE GRAY, 1821

Guinea Pig, Cui, Cavy

Genus *Cavia* Pallas, 1766

Cavia tschudii Fitzinger, 1857

Taxonomic Remarks: Some names used for Bolivian specimens have type localities outside of Bolivia. *Mus Porcellus* was described by Linnaeus (1758: 59) for the domestic guinea pig, habitat "Brasilia." *Cavia aperea* was described by Erxleben (1777: 348), type locality Pernambuco, Brazil. *Cavia tschudii* was described by Fitzinger (1857: 154), type locality Ica, Peru. *Cavia tschudii pallidior* was described by Thomas (1917a: 158), type locality "Arequipa [Peru]. Type from 2500 m." *Cavia tschudii sodalis* was described by Thomas (1926c: 607), type locality "Norco, Vipos, 2500 m." in the province of Tucumán, Argentina. Woods (*in* Wilson and Reeder, 1993: 779) recognized *Cavia tschudii* and placed *sodalis* in its synonymy; *Cavia nana* was regarded as a synonym of *Cavia aperea*. However, the type locality of *nana* is in Bolivia and the range of *Cavia aperea* as given did not include Bolivia. The synonymy of names used for Bolivian specimens reflects considerable taxonomic uncertainty. Woods (loc. cit.) implied and cited a variety of published taxonomic opinions. These opinions have mostly not been supported by any discussion of evidence. The following are questions without satisfactory answers: Are domestic guinea pigs conspecific with one of the wild species, and if so, which one? How many species live in the wild? Which described forms belong with which species? Until these questions have better answers, the species and subspecies assignments for Bolivia must be regarded as quite tentative.

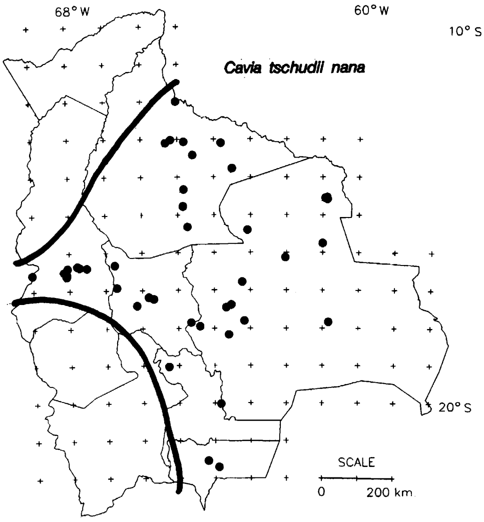


Fig. 761. Localities of known occurrence of *Cavia tschudii nana.*

Morphological Characters and Comparisons: Measurements in tables 18 and 21 are of specimens from Chapare (BM 1 M, 2 F, including 34.9.2.91–95), Incachaca (AM 38710–38713).

Distributional Notes: Known localities are listed below and mapped in figure 761.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Reproduction: A female taken in August had two embryos (29 g each). Juvenals were recorded in July (1) and November (1).

Scientific synonyms used for Bolivian specimens are:

Cavia tschudii nana Thomas, 1917

Kerodon: Bridges, 1846: 8 (Cochabamba and Chuquisaca).

Cavia Aperea: Waterhouse, 1848: 186 (Cochabamba and Chuquisaca).

Cavia nana Thomas, 1917a: 158 (type locality Chulumani, department of La Paz, Bolivia; also Yungas, río Desaguadero). Cabrera, 1961a: 577 (recognized the species).

Cavia tschudii pallidior: Thomas, 1925: 580 (Sierra Santa Rosa).

Cavia tschudii sodalis: Cabrera, 1961a: 579 (in Tarija).

Cavia aperea sodalis: Hückinghaus, 1961: 57. Anderson, 1985b: 14 (name in list). Anderson et al., 1993: 48 (vicinity of Santa Cruz de la Sierra).

Cavia aperea: Glanz and Anderson, 1990: 6 (drawing of tooth). Emmons, personal commun. (pampas near Los Fierros). Anderson, 1993: 43 (general distributional records).

Cavia porcellus: Mercado and Miralles, 1991: 295 (La Paz Valley).

LOCALITIES (45) AND SPECIMENS (149): **Beni:** 1200/6502, río Iténez, 20 km above mouth, 1 AM; 1301/6511, Santa Rosa, 29 FM; 1304/6449, San Joaquín, 1 FM, 1 US; 1306/6348, Bella Vista, 1 US; 1306/6519, Santiago, 18 FM; 1325/6435, Santa Teresa, 1 US; 1346/6330, Lago Victoria, 1 US; 1420/6450, San Pedro, 1 FM; 1446/6451, río Ibare, 24 km from mouth, 3 AM; 1447/6451, río Ibare, 27 km above mouth, 1 AM; 1519/6444, Camiaco, 1 AM; 1545/6100, Los Palmares, 1 MNK. **Chuquisaca:** 1902/6517, Chuquisaca (Waterhouse, 1848). "... common in fields, in the vicinity of Chuquisaca"); 2001/6350, Ibopeite, 1 Frankfurt (Felten, in litt.). **Cochabamba:** 1620/6645, Yungas, 3 CM; 1656/6642, Choro, 2 FM; 1711/6549, Chapare, 6 BM; 1714/6541, Incachaca, 4 AM; 1724/6609, Cochabamba (Waterhouse, 1848). **La Paz:** 1621/6747, Pitiquaya, 1 AM; 1623/6743, Yanacachi, 1 IE; 1624/6731, Chulumani, 3 BM; 1624/6803, Incachaca, 1 IE; 1630/6809, La Paz, 1 MNLP, 6 MACN (not examined); 1633/6805, Cota Cota in La Paz, 1 MNLP; 1634/6902, río Desaguadero, 1 BM; 1637/6805, 2 km by road S Mallaca, 1 AM. **Santa Cruz:** 1432/6053, Parque Nacional "Noel Kempff Mercado," 2 AM, 2 MSB; 1433/6053, Los Fierros, 1 EBD; 1433/6054, 3 km E de Camp "los Fierros," 1 MNK; 1433/6056, Parque Noel Kempff Mercado, Los Fierros camp, 1 CBF, 1 MNK; 1434/6053, 6 km S of Campamento Los Fierros, 1 MNK; 1435/6052, 7 km S of Campamento Los Fierros, 1 MNK; 1524/6305, Ascensión de Guarayas, 11 FM; 1608/6202, Concepción, 1 MNLP; 1647/6314, Estancia Cachuela Esperanza, 1 AM; 1723/6332, San Miguel Rincón, 1 MSB; 1727/6340, Buenavistas, 1 BM; 1748/6310, Santa Cruz de la Sierra, 1 CM, 9 US, + 2 from owl pellets in collection in La Paz; 1750/6050, San José de los Chiquitos, 1 IML; 1751/6439, 3 km by road N of Torrecillas, 1 AM; 1757/6424, 6 km S and 10 km E Comarapa, río Pulquina Valley, 1 AM; 1810/6336, Vermejo, 3 AM. **Tarija:** 2132/6412, Entre Ríos, 2 US; 2142/6354, Sierra Santa Rosa, 6 BM. **Department unknown:** Bolivia, 4 MACN (not examined); perhaps Bolivia, 2 MNLP.

Genus *Galea* Meyen, 1832

Galea musteloides Meyen, 1832

Vernacular names are Yellow-toothed Cavy or Cui Común. In common useage different species of cuis are not recognized. Some local people think that all cuis are domestic or have escaped from captivity. On more than one occasion, I have heard this stated or implied. For example, upon observing a guinea pig (*Galea musteloides* on the Altiplano) by the roadside, I have had a driver tell me that it must have escaped from some nearby house.

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Galea musteloides* was described by Meyen (1832: 597), type locality Paso de Tacna, on the road to Lake Titicaca, Peru. *Cavia flavidens* was described by Brandt (1835: 439), type locality unknown, taxonomic status uncertain, perhaps conspecific with *Galea spixii*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Thomas based the description of *demissa* on one adult skull. He had one skull of a young animal also. He compared *demissa* with "true *boliviensis* of the high Andian plateau" and stated that the skull was longer

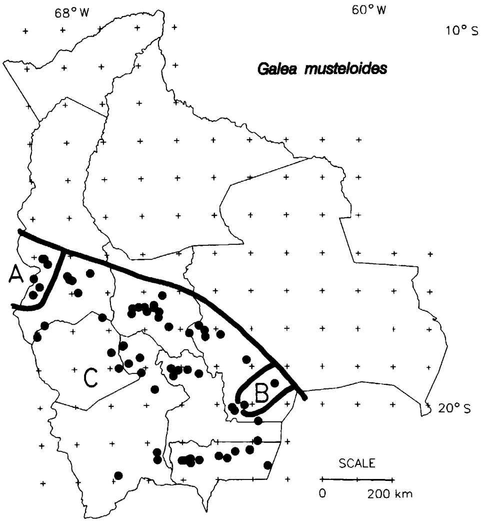


Fig. 762. Localities of known occurrence of three subspecies of *Galea musteloides*, *G. m. auceps* (A), *G. m. demissa* (B), and *G. m. musteloides* (C).

and proportionally narrower, the zygomata "less boldly thrown out," upper outline less strongly bowed, muzzle longer, nasals longer and more parallel-sided, interorbital region with edges more openly concave, and braincase narrower. Some measurements of the holotype of *demissa* were head and body, 232 mm; hind foot, 36; ear, 21 (these recorded by the collector in the field); "median upper length" [probably = occipitonasal length], 53.3; condyloincisive length, 49; zygomatic breadth, 31.2; nasals, 18.3 by 7.3; interorbital breadth, 12; breadth of braincase, 20.7; palatilar length, 23.5; length of bulla, 12.5; upper molar series (crowns), 11.7. The pale and yellowish subspecies *G. m. auceps* is rather distinct in comparison to the darker nominate subspecies, but the status of *G. m. demissa* needs to be reviewed.

DISTRIBUTIONAL NOTES: Most of the localities are in the highlands but the range extends eastward into the valleys and foothills and onto the lowlands of the Chaco. Known localities are listed below and mapped in figure 762.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

PARASITOLOGY: Fonseca (1960: 93) reported a tick (Ixodidae, genus *Amblyomma*) from *Galea musteloides* from Vallegrande (1830/6406) in Santa Cruz and another (Laelaptidae, *Cavilaelaps bresslaui*) from Samaipata (1809/6352), Vallegrande, and Padilla (1919/6420). Fonseca (1960: 130) reported a tick (Macronyssidae, *Bdellonyssus vitzhumi*) from Aiguile (1807/6509), Valleabajo (coordinates unknown), Samaipata (1809/6352), Vallegrande, and Cuevo (2027/6332) from *Galea musteloides*. Fonseca (1960: 135) reported *Trombicula whartoni* (Trombiculidae) from Valleabajo. Specimens of several species of fleas have been reported: *Neotyphloceras crassispina hemisus* from Pucara [1843/6422], Samaipata, Aiquile, and Valle Grande (Hopkins and Rothschild, 1966: 136); *Tiamastus cavicola* from Padilla, Pucara, Quirusillas, Sucre, Samaipata, Terija [= Tarija], Valleabojo, and Valle Grande (Smit, 1987: 232); *Polygenis* (*Polygenis*) *platensis cisandinus* from Aiquile (Smit, 1987: 290), and *Polygenis* (*Polygenis*) *trapidoi mendezi* from Padilla (Smit, 1987: 311). I have not seen voucher specimens of the host.

REPRODUCTION: One female of *G. m. auceps* in November had three embryos. Two females of *G. m. musteloides* in May and August each had three embryos.

Scientific synonyms used for Bolivian specimens are given under the subspecies below:

Galea musteloides auceps Thomas, 1911

Kerodon auceps Thomas, 1911b: 255 (type locality "Guarina," department of La Paz, Bolivia; also Achacoche and río Desaguadero).

LOCALITIES (6) AND SPECIMENS (18): **La Paz:** 1603/6843, Achacoche, Lake Titicaca, 3 BM; 1603/6846, 5 km W Achacachi, 5 US; 1612/6838, Guarina, 2 BM; 1634/6902, río Desaguadero, 2 BM; 1648/6853, 14 km by road SW of San Andrés de Machaca, 1 AM, 1 MSB; 1700/6904, 11.5 km W of San Andrés de Machaca, 2 AM, 1 CBF, 1 MSB.

Measurements in tables 18 and 21 are of specimens from near San Andres de Machaca (AM 268934) and Guarina (BM 1.1.1.91, the holotype), respectively.

Galea musteloides demissa Thomas, 1921

Galea boliviensis demissa Thomas, 1921f: 623 (type locality "San Antonio, Parapiti," 600 m elevation, department of Santa Cruz, Bolivia).

Galea musteloides demissa: Tate, 1935: 347 (first use of name combination). Anderson, 1993: 43 (general distributional records).

Galea musteloides: Parker et al., 1993: 101 (Curuyuqui).

Localities (2) and Specimens (4): **Santa Cruz:** 1927/6221, Cerro Colorado, 2 EBD; 2001/6313, San Antonio, río Parapeti, 2 BM.

Galea musteloides musteloides
Meyen, 1832

Galea musteloides: Thomas, 1926b: 327 (Tablada, Carlazo, Sama); 1926d: 195 (Lipez, Tupiza). Fonseca, 1960: 93 (ectoparasites, Vallegrande, Samaipata, and Padilla). Hopkins and Rothschild, 1966: 136 (fleas from Pucara, Valle Grande, Samaipata, and Aiquile). Eisentraut, 1983: 106 (name in list). Yoneda, 1984b: 12 (Collana, Huajchilla); 1984c: 56 (Huajchilla). Smit, 1987: 232, 290, 311 (fleas from localities noted under Parasitology). Salazar Bravo, 1990: 195 (observed near the Laguna Colorada). Mercado and Miralles, 1991: 295 (La Paz Valley). Biknevicius, 1993: 96 (functional anatomy; AMNH 262993, 262994, 262997–262999, 263001).

Cavia boliviensis Waterhouse, 1848: 175 (type locality high tableland between Cochabamba and La Paz, restricted to Paratani and one of "cotypes" selected as lectotype by Thomas, 1911b: 255). Gerrard, 1862: 198 (Waterhouse's specimen). Thomas, 1898a: 278 (Esperanza). Créqui Montfort and Sénéchal de la Grange, 1904: 97 (mention specimens preserved in alcohol, no specific locality).

Kerodon boliviensis: Thomas, 1902a: 143 (Paratani, Caracolto); 1902b: 229 (Livicucho, Sucre, El Cabrado, Potosí); 1911a: 154 (Paratani, Sucre). Neveu-Lemaire and Grandidier, 1911: 16 (following Thomas 1902a, 1902b). Eisentraut, 1933: 60 (the "Wilde Meerschweinchen" noted near Palo Marcado were probably *Galea musteloides*, no specimen).

Kerodon musteloides: Thomas, 1911b: 255 (near Sahama).

Cavia musteloides boliviensis: Osgood, 1915: 210 (Parotani).

Galea boliviensis: Thomas, 1927a: 554 (Bolivia).

Galea musteloides musteloides: Cabrera, 1953: 42 (Bolivia; use of name combination); 1961: 574. Anderson, 1985b: 14 (name in list). Anderson, 1993: 43 (general distributional records). Anderson et al., 1993: 48 (vicinity of Santa Cruz de la Sierra). Yensen and Tarifa, 1993: 58 (mention Sahama and Esperanza).

Kerodon [= *Galea*] *boliviensis*: Smit, 1987: 232 (fleas from Sucre, *Tiamastus cavicola* with *Pulex concitus*, a junior synonym).

Galea flavidens: Hershkovitz, 1987b: 75 (Cochabamba, La Paz, Chuquisaca).

Localities (60) and Specimens (244): **Chuquisaca:** 1902/6517, Sucre, 2 BM; 1904/6449, 12 km N and 11 km E of Tarabuco, 2 MNLP, 1 MSB; 1905/6505, La Cabrada, 1 BM (Thomas, 1902b); 1911/6430, Tomina, province of Tomina, 2 US; 1914/6513, Pulce, 3 AM; 2058/6251, 30 km S of Carandaiti, 1 LACM. **Cochabamba:** 1706/6529, Yungas del Palmar, 1 BM; 1721/6543, Cuchacancha, 7 AM; 1724/6609, Cochabamba, 12 CM, 7 MACN (not examined); 1724/6559, 15 km E of Cochabamba, 1 EBD; 1725/6543, Tiraque, 1 ANSP, 8 BM, 5 FM, 2 KU; 1726/6619, Vinto, 6 AM; 1731/6555, 17 km by road W of Arani, 1 MNLP; 1732/6535, Vacas, 1 CM; 1734/6621, Parotani, 26 AM, 4 BM, 11 FM, 2 MCZ; 1741/6536, 7.5 km SE of Rodeo, 1 MSB; 1756/6519, Mizque, 1 AM; 1806/6445, río Mizque, Ele-Ele, 1 ANSP. **La Paz:** 1628/6728, Irupana, 1 IE; 1632/6806, río Calacoto near La Paz, 1 EBD; 1637/6803, Huajchilla, 1 EBD, 1 MNLP; 1639/6758, Collana, 4 MNLP; 1659/6749, Caracato, 1 AM; 1749/6847, Esperanza, province of Pacajes, 4 FM, 5 BM; coordinates uncertain, Pacajes [province], 2 MACN (1 not examined); coordinates uncertain, Yanacachi, 1 IE. **Oruro:** 1739/6710, Caracollo, 1 BM; 1807/6900, Sahama, 3 BM; 1835/6657, Callipampa, 2 ANSP; 1853/6628, Livicucho, 1 BM; 1900/6645, Huari, 1 AM; 1908/6607, 7 km S and 4 km E of Cruce Ventilla, 2 AM; 1 MSB. **Potosí:** 1824/6636, Catavi, 2 ANSP; 1825/6638, Llallagua, 2 ANSP; 1844/6609, 3 km SE of Pocoata, 1 AM; 1935/6545, Potosí, 2 BM; 2115/6544, Oploca, Finca Salo, 1 ANSP; 2127/6543, Tupiza, 5 BM; 2151/6651, Lipez, 3 BM. **Santa Cruz:** 1754/6429, Comarapa, 10 BM, 3 FM, 1 UMMZ, 1 US; 1802/6419, 6 km NNE of Quiñe (Estancia Jahue), 1 MSB; 1809/6352, Samaipata, 3 BM, 2 MACN; 1812/6418, 17 km S of Quiñe (Estancia Laja), 1 AM; 1849/6309, Guanacos, province of Cordillera, 4 FM, 1 MCZ; 2005/6334, near Camiri, 2 CAS; 2010/6330, Yuti, 10 km S Camiri, 1 US; 2027/6250, 53 km E of Boyuibe, 1 MNK. **Tarija:** 2112/6305, 12 km SW Capirenda, 1 LACM; 2113/6305, 13 km SW Capirenda, 1 LACM; 2115/6330, Villa Montes, 2 ZFMK (R. M. Wetzel, personal commun.); 2115/6330, río Pilcomayo, 1 AM; 2122/6358, 18 km W Palos Blancos by road, 1 AM; 2126/6344, 2 km S and 5 km E of Palos Blancos, 1 AM; 2126/6447, San Lorenzo, 1 ANSP; 2127/6449, 1 km E of Tucumilla, 1 AM; 2128/6432, Carlazo, 3 BM; 2128/6448, Erquis, 1 AM, 1 CBF, 2 MSB; 2129/6457, 1 km E of Iscayachi, río Tomayapo, 4 AM, 2 CBF, 4 MSB; 2129/6502, Sama, 3 BM; 2133/6447, Tablada, 12 BM, 2 FM; 2138/6234, Estancia Bolivar, 5 AM; **Department unknown:** "Bolivia" only, 1 AM, 2 ANSP, 4 MACN (not examined).

Measurements in tables 18 and 21 are of specimens from Tupiza (26.6.12.84—87, 66.1972), 2058/6251 (LACM 60667), and 1749/6847 (FM 53647, 53648).

Galea spixii (Wagler), 1831

Taxonomic Remarks: The name used for Bolivian specimens has its type locality outside of Bolivia. *Cavia Spixii* was described by Wagler (1831: 512); type locality Brazil, restricted by Cabrera (1961a: 575) to Lagoa Santa, Minas Gerais.

Morphological Characters and Comparisons: Measurements in tables 18 and 21 are of specimens from Guanacos (CM 1974–1977, 2140–2141).

Distributional Notes: Known localities, all in the lowlands of Santa Cruz, are listed below and mapped in figure 763.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Galea spixii campicola Doutt, 1938

Galea spixi campicola Doutt, 1938: 100 (type locality Campo de Guanacos, department of Santa Cruz, Bolivia).

Galea spixii campicola: Cabrera, 1961a: 575. Anderson, 1985b: 14 (name in list). Anderson, 1993: 43 (general distributional records).

Localities (4) and Specimens (13): **Santa Cruz:** 1524/6305, Ascención de Guarayos, 1 FM; 1637/6246, río Quiser, 2 CM, 1 FM; 1739/6245, 3.5 km W of Estación Pailón, 1 AM; 1900/6300, Campo de Guanacos, 8 CM.

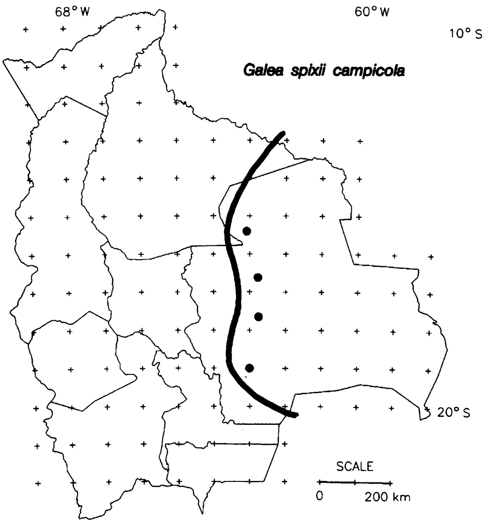


Fig. 763. Localities of known occurrence of *Galea spixii campicola*.

Galea, species uncertain

One specimen: 1819/5934, Santiago, province of Chiquitos, 1 FM (105930), a young individual. The identification needs to be rechecked.

Genus *Microcavia*
Gervais and Ameghino, 1880

Microcavia australis occurs in Argentina near the Bolivian border and eventually it may be found in Bolivia, but I know of no specimen at present. The most probable area is the lowlands of Tarija. Woods (*in* Wilson and Reeder, 1993: 780) cited its distribution as extending into extreme southern Bolivia.

Microcavia niata (Thomas), 1898

Northern Dwarf Cavy

Distributional Notes: Occupies the Altiplano in southwestern Bolivia. Known localities are listed below and mapped in figure 764.

No Bolivian data are available on habitat, habits, behavior, or food.

Parasitology: A nematode, *Helminthoxys pujoli* Quentin (1973: 1077) was described

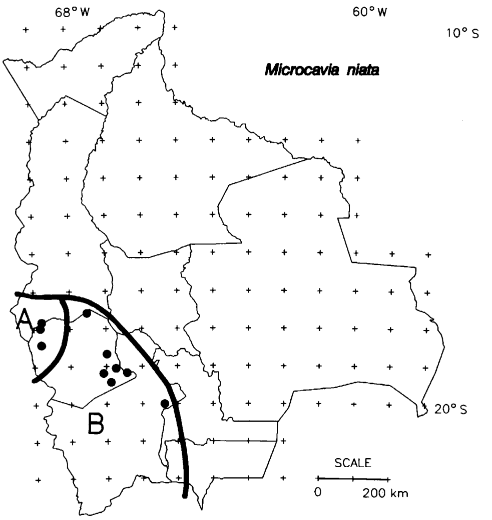


Fig. 764. Localities of known occurrence of two subspecies of *Microcavia niata*, *M. n. niata* (A) and *M. n. pallidior* (B).

from *Caviella niata* from "Sajama, Pampa chiar colla, Departement d'Urumo, Bolivia." It was subsequently regarded as a synonym of *H. caudatus* (Hugot and Sutton, 1989: 391).

REPRODUCTION: One female in November had one embryo.

Scientific synonyms used for Bolivian specimens are given under the subspecies below:

Microcavia niata niata (Thomas, 1898)

Cavia niata Thomas, 1898a: 282 (type locality Esperanza, near Mount Sahama, department of La Paz, Bolivia).

Caviella niata: Osgood, 1915: 195. Quentin, 1973: 1077 (nematode parasite from Sajama).

Monticavia niata: Thomas, 1916d: 303.

Monticavia niata niata: Tate, 1935: 349.

Caviella niata niata: Ellerman, 1940: 246.

Cavia (Microcavia) niata: Pearson, 1951: 170.

Microcavia (Monticavia) niata: Hückinghaus, 1961: 83.

Kerodon niata: Neveu-Lemaire and Grandidier, 1911: 16.

Microcavia niata niata: Cabrera, 1961a: 572 (first use of name combination). Anderson, 1993: 43 (general distributional records). Yensen and Tarifa, 1993: 58 (Sajama and 30 km S and 25 km E of Sajama).

Microcavia niata: Anderson, 1985b: 14 (name in list). Hugot and Sutton, 1989: 391 (nematode from Sajama). Glanz and Anderson, 1990: 32. Biknevicius, 1993: 96 (functional anatomy, AMNH 263000). Durette-Desset and Tcheprakoff, 1990: 141 (specimens in Paris; parasites from Pampa Chiar Calla and Huankarani, both in Oruro? "Departamento d'Urumo").

LOCALITIES (3) AND SPECIMENS (30): **La Paz:** 1749/6847, Esperanza, near Mount Sahama, 6 BM, 19 FM, 1 MACN (not examined). **Oruro:** 1759/6849, Sajama, 3 MNLP; 1825/6848, 30 km S and 25 km E of Sajama, 1 AM.

Measurements in tables 18 and 21 are of specimens from Esperanza (FM 53654—53671).

Microcavia niata pallidior (Thomas, 1902)

Kerodon niata pallidior Thomas, 1902b: 229 (type locality Pampa Aullaga, department of Oruro, Bolivia). Neveu-Lemaire and Grandidier, 1911: 16 (Pampa Aullaga, Sevaruyo).

Caviella niata pallidior: Osgood, 1915: 195.

Monticavia niata pallidior: Thomas, 1916d: 303.

Microcavia (Monticavia) niata: Hückinghaus, 1961: 83 (did not recognize subspecies).

Microcavia niata pallidior: Cabrera, 1961a: 572 (use of name combination). Anderson, 1993: 43 (general distributional records).

Microcavia niata: Ibáñez et al., 1994: 82 (first specimen from Potosí).

LOCALITIES (9) AND SPECIMENS (16): **La Paz:** 1727/6737, Huaraco-Antipampa, 1 from owl pellet (Peñaranda). **Oruro:** 1735/6731, 11.2 km S and 0.8 km E Eucaliptus, 1 AM; 1840/6659, 10 km by road SW of Pazña, 1 UMMZ; 1903/6644, Condo, 1 EBD; 1910/6625, 45 km and 123° from Challapata, 2 AM; 1911/6705, Pampa Aullaga, 3 BM; 1925/6652, Sevaruya, 1 BM. **Potosí:** 1931/6651, río Sevaruyo, 1 from owl pellet (Peñaranda); 2000/6522, Pampa de Talapalca, 4 EBD. **Department unknown:** "Bolivia" only, 1 AM.

SUBFAMILY DOLICHOTINAE POCOCK, 1922

Genus *Dolichotis* Desmarest, 1820

Dolichotis salinicola Burmeister, 1876

Zwergmara, Chacoan Cavy, Conejo del Palo

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality out-

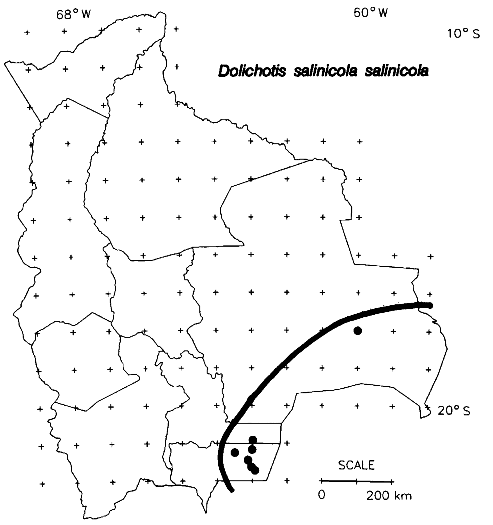


Fig. 765. Localities of known occurrence of *Dolichotis salinicola salinicola.*

side of Bolivia. *Dolichotis salinicola* was described by Burmeister (1876: 634), type locality southeastern Catamarca province, "near the stations Totoralejos and Recreo, about lat. 29° S and long. 65° W" Argentina.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from 2055/6259 (AM 246955) and 2110/6300 (LACM 27369).

DISTRIBUTIONAL NOTES: Known localities, all in the Chaco, are listed below and mapped in figure 765.

No Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Dolichotis salinicola salinicola Burmeister, 1876

Dolichotis salinicola: Krieg, 1929b: 768 (Monte Grande, San José Chiquitos, Pilcomayo). Eisentraut, 1933: 59 (observations near Palo Marcado). Eisentraut, 1983: 58, 108 (color photo, name in list). Mohr, 1942: 125.

Dolichotis salinicola salinicola: Krumbiegel, 1941a: 21. Anderson, 1985b: 14 (name in list). Anderson, 1993: 44 (general distributional records).

Dolichotis salinicola ballivianensis Krumbiegel, 1941a: 21 (type locality Ballivian, Paraguay; San José Chiquitos, Monte Grande).

Pediolagus salinicola salinicola: Cabrera, 1961a: 581 (department of Tarija).

LOCALITIES (8) AND SPECIMENS (12): **Chuquisaca:** 2055/6259, 54.4 km by road E Tiquipa, 1 AM. **Santa Cruz:** 1800/6000, San José Chiquitos, (Krieg, 1929b); coordinates uncertain, Monte Grande, (Krieg, 1929b). **Tarija:** 2110/6300, 5 km S of Capirenda, 1 LACM; 2115/6330, Pilcomayo, 1 (Krieg, 1929b); 2127/6307, Palo Marcado, 6 Berlin (Mohr, 1942); 2138/6301, Estancia Caballo Nambia, 90 km SE Villa Montes, 1 ZFMK (R. M. Wetzel, personal commun.); 2143/6255, Sanuhuate, 1 Berlin (Mohr, 1942), 1 Frankfurt (Felten, in litt.).

FAMILY HYDROCHAERIDAE GRAY, 1825

The single species is not listed under CITES as either endangered or threatened.

Genus *Hydrochaeris* Brünnich, 1772

Hydrochaeris hydrochaeris (Linnaeus), 1766

Capybara, Carpincho

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Sus hydrochaeris* was described by Linnaeus (1766: 103), type locality "Habitat in Surinamo," although Cabrera (1961a: 583) gave Pernambuco, Brazil. *Hydrochoerus capybara* was described by Erxleben (1777: 193), type locality "America australe." Taxonomy has been fairly stable, but the spelling of the name has been the subject of a variety of opinions. Cabrera (1961a: 583) used the name combination *Hydrochaeris hydrochaeris hydrochaeris*. See Husson (1978: 456) for note on nomenclature.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from 1229/6416 (AM 209107), río Ichilo (AM 214638—214640).

DISTRIBUTIONAL NOTES: Occurs commonly throughout the lowlands. Known localities are listed below and mapped in figure 766.

HABITAT: Near water.

No detailed Bolivian data are available on habits or behavior.

PARASITOLOGY: Eight species of intestinal helminths were reported by Casas et al.

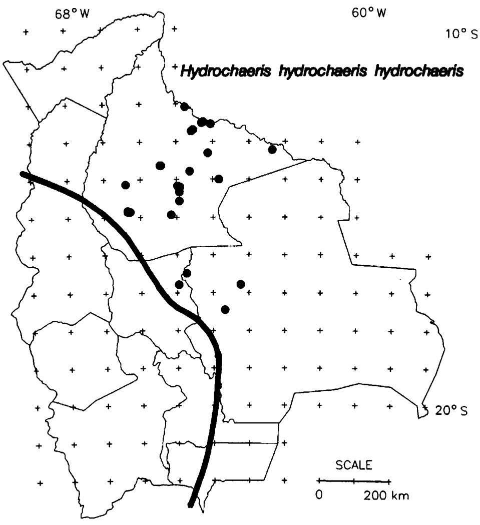


Fig. 766. Localities of known occurrence of *Hydrochaeris hydrochaeris hydrochaeris*.

(1995a), namely the cestodes *Monoecocestus hagmanni*, *M. macrobursatum*, and *M. hydrochoeri*; the nematodes *Habronema clarki*, *Viannella hydrochoeri*, and *Protozoophaga obesa*; and the trematodes *Taxorchis schistocotyle* and *Hippocrepis hippocrepis*. Three new species of eimerians were reported by Casas et al. (1995b), namely *Eimeria trinidadensis*, *E. ichiloensis*, and *E. boliviensis*.

FOOD: Plants, no detailed study has been made.

REPRODUCTION: Young were recorded in June (2), September (1, 8.5 kg weight), and November (1). A female in June had four embryos.

CONSERVATION STATUS: In a study of wildlife used by the Yuqui, Stearman (1990: 379) wrote:

> Capybara have also succumbed to the presence of settlers, but for different reasons [than white-lipped peccaries]. In addition to considering capybara meat bad-tasting, Bolivian nationals throughout the lowlands believe that capybara carry leprosy, probably stemming from the knowledge that they transmit a similar-appearing disease to cattle. In farming regions, capybara are considered a threat to cultivated fields which they routinely invade. From time to time, their hides may also have value in the international market. Since they are relatively slow on land and travel in groups, they are easy to kill. Also, they are prone to sit along the banks of rivers where they can be readily shot from a canoe, or as is now common in the Chimore area, from the silent rafts that bring timber to sawmills downriver. Consequently, when Bolivian nationals are present, capybara are killed in great numbers as an extermination measure, for gain, or just for sport.

I am not certain about the disease mentioned, but the other comments seem supported by my own experience. A disease, "mal de caderas," caused by *Trypanosoma equina*, was mentioned by Kempff (1982: 233). Although present in 1983, capybara were not taken in 1988 at the Chimoré River mission (Stearman and Redford, 1995: 30).

Scientific synonyms used for Bolivian specimens are:

Hydrochaeris hydrochaeris hydrochaeris (Linnaeus), 1766

Hydrochoerus capybara: Waterhouse, 1848: 207 (banks of río Mamoré). Eisentraut, 1933: 59 (near the río Pilcomayo, no exact locality).

Hydrochaeris hydrochaeris hydrochaeris: Anderson, 1985b: 15 (name in list). Anderson, 1993: 44 (general distributional records). Anderson et al., 1993: 48 (vicinity of Santa Cruz de la Sierra).

Hydrochoerus capibara: Arce Pereira et al., 1963: 150 (name in list; río Chapare, Todos Santos).

Hydrochoeris hydrochaeris: Cameron et al, 1989: 69 (observations in western Pando). Mones, 1973: 277 (favored use of *Hydrochoeris* Brisson, 1762); 1984: 7.

Hydrochaeris hydrochaeris: Crespo, 1974: 23 (Buenavista). Suárez Morales, 1986: 41 (undocumented name in list). Tello, 1986: 20 (discussed current status). Stearman, 1990: 380 (Yuquí camp at 1647/6457). Ergueta and Salazar, 1991: 41 (general summary). Emmons, 1991: 73 (seen at Alto río Madidi in La Paz department). Parker et al., 1993: 103 (reported by local people at Curuyuqui). Vargas and Mendez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area). Stearman and Redford, 1995: 30 (Chimoré River mission = Campamento Yuquí). Casas et al., 1995a, 1995b (intestinal parasites).

Hydrochoerus hydrochaerus: Eisentraut, 1983: 108 (name in list).

Hydrochoerus hydrochaeris hydrochaeris: Pilleri and Pilleri, 1984: 81 (Estancia La Havana).

Hydrochoerus hydrochaeris: Pilleri, 1977b: 41 (Estancia La Habana). Cabot et al., 1986: 43. Mones and Ojasti, 1986: 1 (general information).

Hydrocheorus hydrochaeris: Biknevicius, 1993: 96 (functional anatomy, AMNH 214624, 214635).

LOCALITIES (28) AND SPECIMENS (65): **Beni:** 1205/6445, río Iténez, between Bahia da Onça and Casa Alta, 1 AM; 1229/6415, río Iténez, 4 km above Costa Marques [Brazil], 2 AM; 1229/6416, río Iténez, 2 km above Costa Marques, 1 AM; 1230/6418, mouth of río Baures, 1 AM; 1232/6403, río Iténez, 40 km above Costa Marques, 3 AM; 1241/6432, 15 km above Horquilla on río Machupo, 2 AM; 1243/6435, 20 km above Horquilla on río Machupo, 3 AM; 1313/6221, río Iténez, 20 km W Larangeira, 1 AM; 1318/6408, 3 km N Magdalena on río Itonamas, 1 US; 1338/6525, río Yacuma, 1.5 km from mouth, 3 AM; 1338/6527, río Yacuma, 7 km from mouth, 2 AM; 1347/6438, río Ipururupuro, Estancia La Havana (Pilleri and Pilleri, 1984); 1400/6350, Los Totumu, 1 MNK; 1408/6624, Espíritu, 5 IE, 1 MNLP; 1410/6449, Estancia La Habana (no. 663, Pilleri, 1977b: 41); 1410/6458, río Tijamuchi, 4 km from mouth, 2 AM; 1412/6454, 5 km N Puerto Leique on río Mamoré, 1 AM; 1420/6455, 10 km W San Pedro, on río Mamoré, 1 AM; 1434/6455, 23 km W San Javier, on río Mamoré, 8 AM; 1451/6617, río Matos at road crossing, 2 EBD; 1450/6621, camino San Borja to Trinidad, 4 EBD; 1451/6621, Estación Biológica del Beni, 1 MSB; 1456/6509, río Tijamuchi, 4 MSB. **Cochabamba:** 1647/6457, Campamento Yuquí, 1 MNLP. **Santa Cruz:** 1629/6444, río Ichilo, 54 km S of mouth of río Chapare, 3 AM; 1647/6314, Estancia Cachuela Esperanza, 1 MSB; 1727/6340, Buenavista, 1 BM, 2 FM, 2 MACN (Crespo, 1974). **Department unknown:** coordinates uncertain, Bahía de las Piedras, 2 MNK; "Bolivia" only, 2 FM; perhaps Bolivia, 1 MNLP.

FAMILY DASYPROCTIDAE
BONAPARTE, 1838

No Bolivian dasyproctid is listed under CITES. Observations in Bolivia of another species, *Myoprocta pratti*, have been reported (Emmons and Smith, 1992) and are mapped in figure 767.

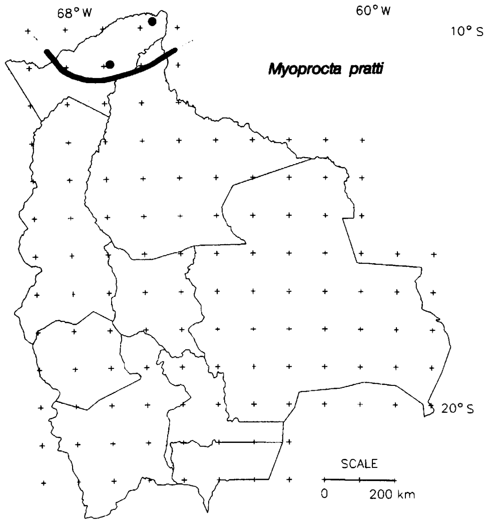


Fig. 767. Localities of known occurrence of *Myoprocta pratti*.

Genus *Dasyprocta* Illiger, 1811

Dasyprocta punctata Gray, 1842

Hochi Colorado, Agouti

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Dasyprocta azarae* was described by Lichtenstein (1823: 3), type locality São Paulo, Brazil. This species was reported by Emmons and Feer (1990: 208) without documentation, as occurring in extreme eastern Santa Cruz department in Bolivia. This species was recognized by Woods (*in* Wilson and Reeder, 1993). *Dasyprocta punctata* was described by Gray (1842: 264); type locality "South America" changed by Goodwin (1946: 417) to "Realejo, Nicaragua." *Dasyprocta variegata* was described by Tschudi (1844: 190, pl. 16), type locality Chanchamayo region, eastern Peru. Emmons and Feer (1990) used the name *Dasyprocta variegata* for other Bolivian populations of *Dasyprocta* and restricted the species *Dasyprocta punctata* to Central America and northwestern parts of South America. Documentation of evidence for these taxonomic judgments is needed. *Dasyprocta variegata urucuma* was described by Allen (1915c: 634), type locality Urucum, near Curumbá, Matto Grosso, Brazil.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: See the end of each subspecies account.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 768.

No detailed Bolivian data are available on habitat, habits, or behavior.

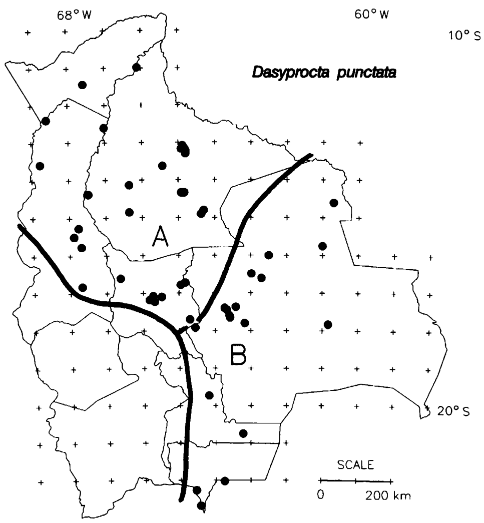


Fig. 768. Localities of known occurrence of two subspecies of *Dasyprocta punctata*, *D. p. boliviae* (A) and *D. p. yungarum* (B).

Parasitology: Fonseca (1960: 92, 106) reported ticks (Ixodidae, *Ixodes* sp. and *Amblyomma* sp.; and Laelaptidae, *Gigantlaelaps barrerai* and *Laelaps castroi*) from *Dasyprocta variegata* from Buen Retiro (1717/6338) and *Amblyomma cajennense*, another ixodid, from Novillos (coordinates unknown). Several species of fleas have been reported: *Rhopalopsyllus lugubris lugubris* from Agua Hedionda [1810/6344] and Floripondio [1804/6445] by Smit (1987: 205); *Rhopalopsyllus australis tamoyus* from Buen Retiro, Cabezas, Curiche, Floripondio, Gutierrez, Lagunillas, Novillos, and Pirirenda (Smit, 1987: 212); *Rhopalopsyllus crypturi* from Agua Hedionda (Smit, 1987: 215); *Tiamastus cavicola* from Agua Hedionda (Smit, 1987: 232); *Polygenis* (*Gephyropsylla*) *klagesi samuelis* from Agua Hedionda (Smit, 1987: 250); and *Polygenis* (*Polygenis*) *roberti beebei* from Gutierrez (Smit, 1987: 281). I have not seen voucher specimens of the host, but, considering the distinctiveness and familiarity of *Dasyprocta*, there need be little uncertainty as to its identity.

Reproduction: A female in August had two embryos. Other females in April (1) and July (3) each had two embryos (W. Townsend, in litt.). Females with one embryo were recorded in July and August.

Scientific synonyms for Bolivian subspecies are given below.

Dasyprocta punctata boliviae

Thomas, 1917

Dasyprocta azarae: Waterhouse, 1848: 389 (Santa Cruz de la Sierra). Gerrard, 1862: 195 (one specimen from Bridges's collection, Bolivia only). Alston, 1876: 350 (Santa Cruz de la Sierra). Pilleri, 1977b: 47 (name in list, no specific locality). Parker et al., 1993: 102 (seen at Curuyuqui). L. Emmons, personal commun. (bosques near Los Fierros).

Dasyprocta variegata boliviae Thomas, 1917b: 312 (type locality Yacuiba, department of Tarija, Bolivia). Ellerman, 1940: 195.

Dasyprocta variegata: Fonseca, 1960: 92 (ectoparasites, Buen Retiro, 1717/6338).

Dasyprocta punctata boliviae: Cabrera, 1961a: 589 (first use of name combination). Anderson, 1985b: 15 (name in list). Suárez Morales, 1986: 40 (undocumented name in list). Smit, 1987: 205, 212, 215, 232, 250 (fleas from Agua Hedionda, Buen Retiro, Cabezas, Curiche, Floripondio, Gutierrez, Lagunillas, Novillos, and Pirirenda). Anderson, 1993: 44 (general distributional records). Anderson et al., 1993: 48 (vicinity of Santa Cruz de la Sierra).

Localities (21) and Specimens (53): **Chuquisaca:** 1944/6411, 14 km NW of Monteagudo, 4 CBF; 2045/6313, Porvenir, 1 MSB. **Santa Cruz:** 1436/6042, El Encanto Cascades, 1 US, 1 MSB; 1545/6100, Los Palmares, 1 MNK; 1600/6230, Totaitu, 1 MNK; 1629/6259, 142 km N of Santa Cruz, 2 MNLP; 1636/6242, 10 km N of San Ramón, 3 AM, 4 MSB; 1724/6344, 7 km N and 17 km W Buenavista, 2 AM; 1722/6325, río Grande, province of Sara, 1 CM; 1722/6325, río Surutú, province of Sara, 1 CM, 1 MACN (not examined); 1727/6340, Buenavista, 1 AM, 2 BM, 1 CM, 1 FM, 8 MACN (not examined); 1736/6336, San Rafael de Amboró, 1 MNK; 1739/6335, 4.5 km S and 2 km E of San Rafael de Amboró, 3 AM; 1748/6310, Santa Cruz, 2 MACN (not examined); 1748/6310, Santa Cruz de la Sierra, (Thomas, 1917); 1750/6050, San José de los Chiquitos, 1 IML; 1755/6433, Charo Negro, 11 km [by road NW of] Comarapa, 3 EBD; coordinates uncertain, Nueva Moka, 2 MACN (not examined); 1804/6445, Floripondio, 1 MACN (not examined). **Tarija:** 2202/6345, Yacuiba, 1 BM; 2216/6433, 3 km

SE of Cuyambuyo, 1 AM, 1 CBF; 2241/6426, río Lipeo, 2 ANSP.

Measurements in tables 18 and 21 are of specimens from 1724/6344 (AM 246956, 246957), 2241/6426 (ANSP 18211, 18212), 1727/6840 (AM 61799, BM 28.2.9.73, CM 2752).

Dasyprocta punctata urucuma Allen, 1915

Dasyprocta punctata urucuma: Cabrera, 1961a: 590 (first use of name combination; part of Bolivia adjacent to Mato Grosso, Brazil).

Dasyprocta azarae; Emmons and Feer, 1990: 208 (mentioned Bolivia and mapped as occurring in extreme eastern Santa Cruz department, but not otherwise documented).

Specimens: None from Bolivia.

Dasyprocta punctata yungarum Thomas, 1910

Dasyprocta sp.: Thomas, 1902a: 142 (Charuplaya).

Dasyprocta variegata yungarum Thomas, 1910c: 505 (type locality "Chimosi, alt. 1700 m." in the department of Cochabamba, Bolivia; Puente de Choculo, Yungas).

Dasyprocta variegata: Neveu-Lemaire and Grandidier, 1911: 16 (Charuplaya). Emmons, 1991: 73 (Alto río Madidi, also seen at 13 km W of Ixiamas and río Machariapo, all in La Paz department).

Dasyprocta punctata yungarum: Cabrera, 1961a: 590 (first use of name combination). Anderson, 1985b: 15 (name in list). Anderson, 1993: 44 (general distributional records).

Dasyprocta varigata bolivianae: Arce Pereira et al., 1963: 150 (name in list; Chipiriri, Todos Santos, Palmar).

Dasyprocta punctata: Cabot et al., 1986: 43. Tello, 1986: 22 (discussed current status). Cameron et al, 1989: 69 (observations in western Pando).

Dasyprocta spp.: Stearman, 1990: 380 (Yuqui camp at 1647/6457).

LOCALITIES (34) AND SPECIMENS (195): **Beni:** 1059/6606, Riberalta, 1 US; 1236/6701, Cavinas, río Beni, 2 US; 1305/6453, Aseradero Monte de San Pablo, 1 MNK; 1310/6449, San Marco, 1 FM; 1310/6455, Veinte y Dos, 15 AM; 1313/6448, Barranquita, 1 FM; 1315/6448, Yutiole, 13 AM; 1318/6448, 10 km S Barranquita, 2 FM; 1338/6526, río Yacuma, 4 km from mouth, 1 AM; 1408/6621, Espíritu, 2 IE; 1420/6450, San Pedro, 1 FM; 1420/6455, 10 km W San Pedro on río Mamoré, 1 AM; 1422/6728, Chaterona, 1 ANSP; 1448/6418, Ibiato, 57 CBF, 53 MNK (+ 13, W. Townsend, in litt.); 1451/6621, Reserva Biológica del Beni, 1 EBD; 1454/6422, 6 km W of Casarabe, 1 AM; coordinates uncertain, "Beni" only, 1 AM. **Cochabamba:** 1636/6637, Charuplaya, 2 BM; 1643/6449, río Chimoré, 3 CBF; 1647/6457, Campamento Yuqui, 4 MNLP; 1705/6543, Valle de Pampatambo, 1 EBD; 1706/6529, Yungas El Palmar, 2 ANSP, 1 FM, 1 MACN (not examined); 1711/6549, Chapare [region], 1 MACN (not examined); 1714/6541, Incachaca, 3 CM; 1742/6442, San Mateo, 1 IML; coordinates uncertain, Yunga San José, 1 CM (Cochabamba?). **La Paz:** 1335/6846, Alto río Madidi (Emmons, 1991: 73); 1516/6745, Chiniri, 1 ANSP; 1530/6753, Chimosi, 1 BM; 1546/6736, Caranavi, 1 TTU; 1546/6741, 10 km W Caranavi, 1 MSU; 1649/6741, Puente de Choculo, 1 BM (Thomas, 1910c); coordinates uncertain, Yungas (Thomas, 1910, La Paz? specimen?). **Pando** 1126/6734, Independencia, 1 AM; 1223/6835, Chivé, 1 AM, 1 MNLP.

Measurements in tables 18 and 21 are of specimens from 1318/6448 (FM 96173), 1706/6529 (ANSP 19426, 19427), 1714/6541 (CM 5258, 5259). Data for Ibiato in table 18 are from W. Townsend (in litt.).

Dasyprocta punctata, subspecies not determined

LOCALITIES (3) AND SPECIMENS (18): **Department unknown:** coordinates uncertain, río Beni, 1 MACN (not examined); Bolivia only, 2 BM, 9 MACN (not examined); perhaps Bolivia, 6 MNLP.

FAMILY AGOUTIDAE GRAY, 1821

Genus *Agouti* Lacépède, 1799

Only one of the two living species occurs in Bolivia.

Agouti paca (Linnaeus), 1766

Spotted Paca, Hochi Pintado, Paca, Paca Grande, Guatusa

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality out-

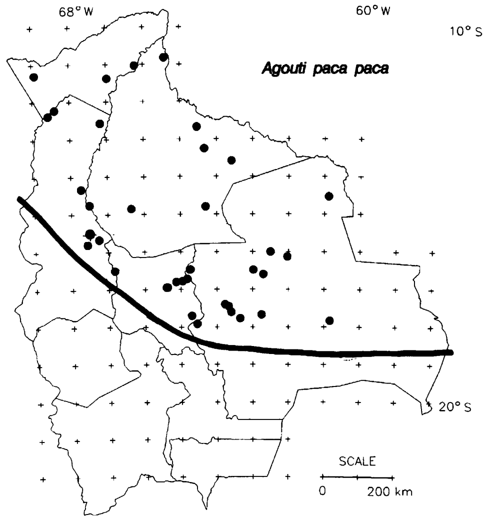


Fig. 769. Localities of known occurrence of *Agouti paca paca.*

side of Bolivia. *Mus paca* was described by Linnaeus (1766: 81); type locality fixed by Hollister as Cayena, French Guiana; see Tate (1935: 315) for discussion. Thomas (1901h: 532) used the name combination *Agouti paca.*

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from 1648/6508 (AM 38804), 1657/6522 (UM 126853), 1628/6445 (AM 214642), and 1727/6340 (ANSP 14269, FM 21390, 34337). Data for Ibiato in table 18 are from W. Townsend (in litt.).

DISTRIBUTIONAL NOTES: Widely distributed and common in the lowlands except in the Chaco and extending up into the Yungas to at least 2500 m elevation (Incachaca). Known localities are listed below and mapped in figure 769.

HABITAT: "Agoutis are known to be associated with human activities such as gardens or forest fallows where [there is] a steady supply of food . . . ." (Stearman, 1990: 381). In her study of the use of wildlife by the Yuquis, she also judged that a depletion of larger species in the area hunted was a factor in changing their hunting practices to target agouti specifically.

No detailed Bolivian data are available on habits or behavior.

PARASITES: Fonseca (1960: 92) reported the tick (Ixodidae, *Ixodes luciae*) from "*Cuniculus paca paca*" from Buen Retiro (1717/6338). Cysts of the cestode *Echinococcus vogeli* were reported from one specimen by Gardner et al., 1988: 399). Specimens of several species of fleas have been reported: *Adoratopsylla* (*Tritopsylla*) *intermedia intermedia* and *Neotyphloceras crassispina hemisus* from Buen Retiro (Hopkins and Rothschild, 1966: 120, 136); *Rhopalopsyllus lugubris lugubris* from Buen Retiro (Smit, 1987: 205); and *Rhopalopsyllus australis tamoyus* from Buen Retiro (Smit, 1987: 212); *Polygenis* (*Polygenis*) *roberti beebei* from Buen Retiro (Smit, 1987: 281). I have not seen voucher specimens of the host, but, as in the case of *Dasyprocta*, there need be little uncertainty.

FOOD: No detailed data available.

REPRODUCTION: Young were recorded in May, July, August, and October. Single embryos were recorded in August in each of six females (in part, W. Townsend, in litt.).

CONSERVATION STATUS: Common. Heavily hunted for food in many areas. Not listed under CITES.

Scientific synonyms used for Bolivian specimens are:

Agouti paca paca (Linnaeus, 1766)

Coelogenys paca: Waterhouse, 1848: 370 (Santa Cruz de la Sierra).

Cuniculus paca paca: Tate, 1935: 316. Ellerman, 1940: 225 (use of name combination). Fonseca, 1960: 92 (ectoparasites, Buen Retiro).

Agouti paca paca: Krumbiegel, 1940e: 224 (use of name). Anderson, 1985b: 15 (name in list). Suárez, 1986: 40 (undocumented name in list). Pérez, 1992: 1 (summary of species). Anderson, 1993: 44 (general distributional records). Anderson et al., 1993: 49 (vicinity of Santa Cruz de la Sierra).

Agouti paca: Arce Pereira et al., 1963: 150 (name in list; Chipiriri, Todos Santos). Cabot et al., 1986: 43. Tello, 1986: 21 (discussed current status). Cameron et al, 1989: 69 (observations in western Pando). Stearman, 1990: 380 (Yuquí camp at 1647/6457). Emmons, 1991: 73 (seen at Alto río Madidi in La Paz department). Vargas and Méndez *in* Altamirano and Seidel, 1992 (reported from Isiboro-Sécure area).

Cuniculus paca: Hopkins and Rothschild, 1966: 120 (fleas from Buen Retiro). Pilleri, 1977b: 42 (Estancia La Habana). Eisentraut, 1983: 106

(name in list). Gardner et al., 1988: 399 (parasites, 10 km N of San Ramón).
Cuniculus [= *Agouti*] *paca*: Smit, 1987: 205, 280 (fleas from Buen Retiro).

LOCALITIES (43) AND SPECIMENS (146): **Beni:** 1049/6525, Guayaramerin, 2 AM; 1241/6432, 15 km above Horquilla on río Machupo, 1 AM; 1315/6420, Piedras Blancas, 1 MNK; 1335/6335, Baures, 1 US; 1410/6449, Estancia La Habana (no. 664, Pilleri, 1977: 42); 1448/6418, Ibiato, 30 CBF, 28 MNK; 1451/6621, Reserva Biológica del Beni, 2 EBD; 1451/6621, Totaisal, 1 km SW of Estación Biológica del Beni, 2 AM. **Cochabamba:** 1628/6445, left bank of río Ichilo, 52 km S of mouth of río Chapare, 1 AM; 1630/6650, río Cotacajes, San Antonio, 1 CBF; 1643/6449, río Chimoré, 8 CBF; 1647/6457, Campamento Yuquí, 5 MNLP; 1648/6508, Todos Santos, 1 AM; 1657/6522, 4 km SE Villa Tunari, 1 UMMZ; 1657/6522, 0.5 km NE Villa Tunari, 1 UMMZ; 1657/6524, San Antonio, 1 AM; 1742/6442, San Mateo, 1 IML. **La Paz:** 1234/6710, Santa Ana de Madidi, 1 CBF; 1420/6743, 20 km NW San Buenaventura, 3 AM; 1445/6730, río Quiquibey, 10 km from mouth, 3 MNLP; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 1 TTU; 1540/6715, Huachi, 1 US; 1548/6734, 8 km SE Caranavi, 1 MSU (not seen). **Pando** 1102/6613, Puerto Candelaria, 1 MNLP; 1117/6855, río Nareuda, 5 AM; 1122/6658, Nueva Etea, 2 AM, 1 MSB; 1213/6824, Santa Rosa, 1 AM, 1 CBF; 1223/6835, Chivé, 2 AM. **Santa Cruz:** 1432/6053, 2 km [N of] Los Fierros, 1 EBD; 1600/6230, Totaitu, 1 MNK; 1608/6202, Concepción, 1 MNLP; 1628/6444, 52 km S of mouth of río Chapare, on right bank of río Ichilo, 1 AM; 1629/6259, 142 km N of Santa Cruz, 1 MNLP; 1636/6242, 10 km N of San Ramón, 1 AM, 3 MSB; 1724/6346, río Japacaní, 125 km N Santa Cruz, 1 ZFMK (R. M. Wetzel, personal commun.); 1724/6346, río Yapacaní, 1 CM, 4 MACN (Crespo, 1974, reported 3, not seen); 1727/6340, Buenavista, 1 AM, 2 ANSP, 4 FM; 1736/6336, San Rafael de Amboró, 1 MNK; 1740/6245, río Grande, 1 MNK; 1746/6321, Las Cruces, 1 MNK; 1750/6050, San José de los Chiquitos, 1 IML; 1755/6433, Charo Negro, 11 km [by road NW of] Comarapa, 2 EBD. **Department unknown:** coordinates uncertain río Beni, 1 MACN (not examined); Bolivia, 4 MACN (not examined); perhaps Bolivia, 2 MNLP.

FAMILY OCTODONTIDAE
WATERHOUSE, 1839

Waterhouse (1839: 79) named the family and included *Ctenomys*, *Octodon*, *Abrocoma*, and *Poephagomys*. The family Octodontidae as used here coincides with the superfamily Octodontoidea of some authors, except for the removal of *Abrocoma*. The relationship of *Abrocoma* is uncertain and may in fact be closer to the chinchillids (Glanz and Anderson, 1990). The recognition of the family Abrocomidae seems warranted.

No octodontid is listed as endangered or threatened under CITES.

SUBFAMILY CTENOMYINAE
LESSON, 1842

The earliest ctenomyines are from the lower late Miocene, and fossil ctenomyines are known from several Bolivian localities (Quintana, 1994).

Genus *Ctenomys* Blainville, 1826

Tuco Tuco, Tojo, Topo,
Cuhuchi (in eastern Bolivia)

Ctenomys boliviensis
Waterhouse, 1848

TAXONOMIC REMARKS: One name used for Bolivian specimens has its type locality outside of Bolivia. *Ctenomys brasiliensis* was described by Blainville (1826: 62), type locality Minas Gerais, Brazil. Cook and Yates (1994: 583) suggested that *Ctenomys boliviensis* as represented by their four samples may be paraphyletic. Their sample 2, from San José de Chiquitos and Roboré, has 36 chromosomes and a unique and fixed allele (6PGD-a). A reasonable inference is that individuals of the population from which sample 2 was drawn probably do not interbreed with other populations to the west and should be recognized as a separate species. No name is available and so a description needs to be published. Other samples had 44 to 46 chromosomes (diploid). Sample 4 of Cook and Yates (1994: 583), from near San Ramón, is here treated as a separate species, *Ctenomys goodfellowi*. With the removal of samples 2 and 4, the remaining samples 1 and 3 may represent a monophyletic evolutionary line. Whether *Ctenomys boliviensis nattereri* from Mato Grosso is part of this line needs reexamination. Anderson et al. (1987: 16) treated *nattereri* as a subspecies. Woods (*in* Wilson and Reeder, 1993: 786) recognized it as a species, *C. nattereri*; however, no evidence or discussion supporting this contrary opinion were presented.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from 1739/6245 (AM 260804) and 1647/6314 (AM 260801).

KARYOLOGY: Diploid chromosome numbers of 36, 42, 44, 45, and 46 were reported for *Ctenomys boliviensis* by Anderson et al. (1987: 16) and Cook et al. (1990: 20). The population with 46 was formerly treated as the subspecies *Ctenomys boliviensis goodfellowi* but is now treated as a separate species, *C. goodfellowi*, following Cook and Yates (1994: 595). They did not use the name *Ctenomys goodfellowi* but they implied support for its use by stating that "this taxon is distinct from *C. boliviensis* at the species level").

DISTRIBUTIONAL NOTES: Known localities, all in the vicinity of Santa Cruz de la Sierra, are listed below and mapped in figure 770.

HABITAT: Soils that are friable and not frequently flooded in the Lowlands.

HABITS: Spend most of their time underground in burrows.

BEHAVIOR: No detailed data are available.

PARASITES: Gardner and Duszynski (1990) reported the presence of eimerian oocysts in the feces of 84 of 236 specimens of *C. boliviensis* examined. A few of these specimens were of the population then referred to *C. boliviensis goodfellowi* but now treated as a separate species.

FOOD: Eat plants, especially underground tubers and roots.

REPRODUCTION: Pregnant females have been recorded in May (15) and June (40). Numbers of embryos are 1 (28 cases), 2 (20), 3 (4), 4 (2), and 5 (1), mean 1.7. Nonpregnant females were recorded in May (5), June (4), August (6), September (5), and October (1).

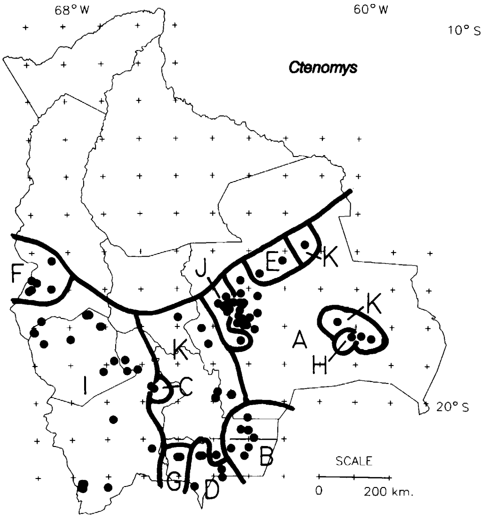


Fig. 770. Localities of known occurrence of the genus *Ctenomys*: *C. boliviensis boliviensis* (A), *C. conoveri* (B), *C. frater frater* (C), *C. frater mordosus* (D), *C. goodfellowi* (E), *C. leucodon* (F), *C. lewisi* (G), *C. minutus* (H), *C. opimus opimus* (I), *C. steinbachi* (J), and *Ctenomys* not yet identified to species (K).

Scientific synonyms used for Bolivian specimens are:

Ctenomys boliviensis boliviensis Waterhouse, 1848

Ctenomys boliviensis Waterhouse, 1848: 278 (type locality Santa Cruz de la Sierra, department of Santa Cruz, Bolivia). Gerrard, 1862: 182 (one from Santa Cruz). Thomas, 1921a: 136 (selected BM 46.7.28.57 as the lectotype). Rusconi, 1928: 238 (Santa Cruz de la Sierra). Gardner, 1988: 90 (phylogeny and parasites). Lessa and Cook, 1989: 857 (seven localities in department of Santa Cruz). Cook et al., 1990: 4 (key to species). Cook, 1990: 6 (karyology). Ergueta and Salazar, 1991: 37 (general summary). Vitullo and Cook, 1991: 360 (sperm morphology, department of Santa Cruz). Biknevicius, 1993: 97 (functional anatomy, AMNH 260804, 260822, 260827, 260828, 260833). Wilkins and Cunningham, 1993: 388 (cranial proportions, data from Anderson et al., 1987). Ruedas et al., 1993: 450 (genome size and chromosomes). Cook and Yates, 1994: 595 (at least their samples 1 and 3, 2 and 4 being regarded as possibly distinct species; electrophoresis of allozymes).

Ctenomys brasiliensis: Gerrard, 1862: 182 (two

Bolivian specimens without exact localities, may be *C. boliviensis*).

Ctenomys boliviensis boliviensis: Cabrera, 1961a: 546 (Santa Cruz de la Sierra). Anderson, 1985b: 14 (name in list). Anderson et al., 1987: 7. Gardner and Duszinski, 1990: 810 (eimerian parasites). Gardner, 1991: 200 (two localities in Santa Cruz). Anderson, 1993: 42 (general distributional records). Anderson et al., 1993: 47 (vicinity of Santa Cruz de la Sierra).

LOCALITIES (27) AND SPECIMENS (486): **Santa Cruz:** 1647/6314, Estancia Cachuela Esperanza, 3 AM, 3 MSB; 1708/6313, 5 km S of Mineros, 4 MSB; 1712/6245, 1 km SE of Puerto Pacay, 20 MSB; 1723/6308, 3 km S and 11 km E of Montero, 14 MSB; 1723/6314, 3 km SE Montero, 1 km N of Villa Copacabana, 17 AM, 11 MSB, 7 MNK; 1723/6315, 3 km S of Montero, 20 MSB; 1723/6332, San Miguel Rincón, 1 AM, 1 MSB; 1724/6309, 6 km S and 10 km E of Montero, 2 MSB; 1725/6311, 10 km SE of Montero, 8 MSB; 1726/6310, 8.5 km S and 8 km E of Montero, 2 MSB; 1735/6315, 4 km SW of La Belgica, 9 MSB; 1739/6245, 3.5 km W of Estación Pailón, 12 AM, 4 MSB; 1744/6317, 8 km W of Santa Cruz, 30 MSB; 1746/6258, 2 km SE of Cotoca, 14 MSB; 1748/6310, Santa Cruz de la Sierra, 2 BM, 3 CM, 1 MSB; 1752/6311, 8.5 km S of Santa Cruz de la Sierra, 1 AM, 1 MSB; 1753/6307, 15 km S of Santa Cruz, 23 AM, 75 MSB, 14 MNK; 1753/6311, 10.5 km S of Santa Cruz de la Sierra, 3 AM; 1754/6311, 12 km S of Santa Cruz de la Sierra, 5 AM, 1 MSB; 1755/6308, 15 km S of Santa Cruz, 83 MSB; 1755/6319, 22 km SW of Santa Cruz de la Sierra, 5 AM, 4 MSB; 1756/6308, 18 km S of Santa Cruz, 14 MSB; 1756/6311, 12 km S and 8 km E of Santa Cruz, 2 AM; 1757/6309, 20 km S of Santa Cruz, 9 MNLP; 1758/6303, 27 km SE of Santa Cruz, 37 MSB, 5 MNK; 1758/6309, Palmar de Oratorio, 9 MSB; 1805/6250, Brecha 5.5, ca. 55 km SE of Santa Cruz, 7 MSB.

Ctenomys conoveri Osgood, 1946

Chacoan Tuco-Tuco or
Tuco-Tuco del Chaco

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Ctenomys* (*Chacomys*) *conoveri* was described by Osgood (1946: 47), type locality Colonia Frenheim, 16 km W of Filadelphia, Paraguay, 60°10′W and 22°15′S. This is the largest species in the genus and on the grounds that it differs "widely from any previously described species," it was placed in a separate subgenus *Chacomys*. Later studies of relationships do not support this subgeneric rank (Cook and Yates, 1994: 595).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from 9 km E of Carandyti (AM 262291 and MSB 56088).

KARYOLOGY: The diploid number of chromosomes in *Ctenomys conoveri* is 48 (Anderson et al., 1987: 15).

DISTRIBUTIONAL NOTES: Known localities, all in the Chaco, are listed below and mapped in figure 770.

HABITS AND BEHAVIOR: Fossorial, as are all *Ctenomys*.

PARASITES: Gardner and Duszynski (1990) reported the presence of eimerian oocysts in the feces of one of three specimens of *C. conoveri* examined.

No detailed Bolivian data are available on food or reproduction.

Scientific synonyms used for Bolivian specimens are:

Ctenomys boliviensis: Eisentraut, 1933: 60 (misidentification, observed on the road between Villa Montes and Palo Marcado and near Samahuate, sketch of tunnel system).

Ctenomys leucodon: Krumbiegel, 1941b: 131 (misidentification, from Villa Montes).

Ctenomys brasiliensis: Eisentraut, 1983: 48, 107 (used in reference to the Tojo in the Chaco region, perhaps *C. conoveri*).

Ctenomys conoveri; Anderson, 1985b: 14 (name in list). Anderson et al., 1987: 12. Gardner, 1988: 90 (phylogeny and parasites). Lessa and Cook, 1989: 857 (9 km E of Carandayti). Gardner and Duszinski, 1990: 805 (eimerian parasites). Cook et al., 1990: 20 (Palo Marcado). Cook, 1990: 6 (karyology). Gardner, 1991: 200 (9.7 km by road E of Carandyti). Biknevicius, 1993: 97 (functional anatomy, AMNH 262290, 262292). Wilkins and Cunningham, 1993: 388 (cranial proportions, data from Anderson et al., 1987). Anderson, 1993: 42 (general distributional records). Ruedas et al., 1993: 450 (genome size and chromosomes). Cook and Yates, 1994: 599 (electrophoresis of allozymes).

Ctenomys: Parker et al., 1993: 103 (reported by local people at Curuyuqui and Perforación, identification uncertain, might be *C. conoveri*).

LOCALITIES (10) AND SPECIMENS (15): **Chuquisaca:** 2046/6300, 9 km by road E of Carandayti, 1 AM, 1 MSB; 2046/6300, 9.7 km by road E of Carandayti, 1 AM; 2045/6313, 1.5 km NW of Porvenir, 1 AM, 1 MSB; 2046/6301, 8 km by road E of Carandayti, 1 AM; 2058/6251, 30 km SE of Carandaiti, 1 LACM. **Santa Cruz:** 2026/6302, 26 km E of Boyuibe, 1 MNK; coordinates uncertain, perhaps in this department, 2 CM. **Tarija:** 2113/6300, 10 km S of Capirenda, 1 LACM; 2115/6330, Villa Montes, 2 Krumbiegel, 1941; 2127/6307, Palo Marcado, 2 Frankfurt (Felten, in litt.).

Ctenomys frater Thomas, 1902

Vernacular names used by Mares et al. (1989) for these animals in Salta were Forest Tuco-Tuco or Tuco-Tuco Colorado. Bolivian specimens are not especially reddish and so the term colorado may not be appropriate here. The source of the name *frater* was not given in the original description.

TAXONOMIC REMARKS: Based on study of allozymes by Cook and Yates (1994: 590), *Ctenomys lewisi* and *C. frater* (as represented by a sample of *C. frater mordosus* from at or near Rancho Tambo) are regarded as more closely related to each other than to any other species within the complex of Bolivian *Ctenomys*.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Thomas (1926b) characterized *C. s. mordosus* as having "size and general external appearance quite as in true *sylvanus*," but the incisors were said to be much broader and heavier, "their combined breadth attaining 7 mm in old specimens as compared with 5.5 mm. in equally aged specimens of *sylvanus*." The rostrum of *mordosus* is thickened, in a manner seen "to a still greater extent in *C. boliviensis*" and in *C. steinbachi*. "An allied species, with equally broad incisors, is the *Ctenomys frater* of Potosi, but that has peculiarly narrowed bullae and is of a decidedly lighter colour."

KARYOLOGY: The diploid number of chromosomes in *Ctenomys frater mordosus* is 52 (Cook et al., 1990: 20). No sample of the nominate subspecies has been studied.

DISTRIBUTIONAL NOTES: The subspecies *C. f. mordosus* occurs at elevations from 600 m (at Yacuiba on the Argentine border) up to 2700 m (Tambo); *C. f. frater* is known only from the type locality at 4300 m. Known localities are listed below and mapped in figure 770.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

PARASITES: Gardner and Duszynski (1990) reported the presence of eimerian oocysts in the feces of three of seven specimens of *C. frater mordosus* examined.

Scientific synonyms relevant to Bolivian specimens are given under the subspecies below:

Ctenomys frater frater
Thomas, 1902

Ctenomys frater Thomas, 1902b: 228 (type locality "Potosi, 4300 m," Bolivia). Neveu-Lemaire and Grandidier, 1911: 14 (Potosí). Rusconi, 1928: 242 (Potosí).

Ctenomys frater frater: Cabrera, 1961a: 548 (Potosí). Anderson, 1985b: 14 (name in list). Cook et al., 1990: 6. Anderson, 1993: 42 (type locality only).

LOCALITIES (1) AND SPECIMENS (3): **Potosí:** 1935/6545, Potosí, 2 BM, 1 ANSP.

Measurements in table 21 are of the holotype (BM 2.2.2.113).

The type locality of *C. frater* was erroneously cited by Woods (*in* Wilson and Reeder, 1993: 784) as in Argentina.

Ctenomys frater mordosus Thomas, 1926

Ctenomys sylvanus: Thomas, 1925: 580 (Caraparí).

Ctenomys sylvanus mordosus Thomas, 1926b: 325 (type locality "Tambo, 2200 m." in Tarija, Bolivia). Rusconi, 1928: 247 (Tambo).

Ctenomys frater mordosus: Cabrera, 1961: 548 (Tambo). Anderson, 1985b: 14 (name in list). Cook et al., 1990: 12. Glanz and Anderson, 1990: 31. Anderson, 1993: 42 (general distributional records).

Ctenomys frater: Gardner, 1988: 90 (phylogeny and parasites). Lessa and Cook, 1989: 857 (8 km W of Rancho Tambo). Cook, 1990: 6 (karyology). Gardner and Duszinski, 1990: 805 (eimerian parasites). Gardner, 1991: 200 (8 km W of Rancho Tambo). Vitullo and Cook, 1991: 360 (sperm morphology, 8 km E of Rancho Tambo). Ruedas et al., 1993: 450 (genome size and chromosomes). Cook and Yates, 1994: 599 (electrophoresis of allozymes).

Localities (7) and Specimens (33): **Tarija:** 2127/6419, Rancho Tambo, 61 km by road E of Tarija, 2 AM; 2127/6423, Tambo, 8 BM, 1 FM; 2127/6424, 8 km W of Rancho Tambo, 3 AM, 2 MSB; 2149/6346, Caraparí, 2 BM; 2202/6345, Yacuiba, 2 BM; 2216/6433, 3 km SE of Cuyambuyo, 4 AM, 1 MSB, 2 CBF; coordinates uncertain, Melocoton, 6 BM.

Measurements in tables 18 and 21 are of specimens from Tambo (AM 2263013—263014) and 8 km W of Tambo (AM 263010–263012).

Ctenomys goodfellowi Thomas, 1921

Taxonomic Remarks: Although Cook and Yates (1994: 595) did not use the name *Ctenomys goodfellowi*, they implied support for its use by stating that "this taxon is distinct from *C. boliviensis* at the species level."

Morphological Characters and Comparisons: Measurements in tables 18 and 21 are of specimens from the type locality (BM 20.11.17.6, holotype) and 1636/6242 (AM 262288, 262289, and MSB 56087).

Karyology: The diploid number of chromosomes in *Ctenomys goodfellowi* is 46 (Anderson et al., 1987: 16). See notes under *Ctenomys boliviensis* above.

Distributional Notes: Known localities are listed below and mapped in figure 770.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Parasites: Gardner and Duszynski (1990) reported the presence of eimerian oocysts in the feces of specimens then referred to *C. boliviensis goodfellowi*.

Reproduction: One female was recorded with one embryo in June, another with no embryo.

Scientific synonyms relevant to Bolivian specimens are:

Ctenomys goodfellowi Thomas, 1921a: 136 (type locality "Esperanza, near Concepcion, Prov. Nuflo de Chaves, E. Bolivia" in department of Santa Cruz).

Ctenomys Goodfellowi: Rusconi, 1928: 246 (Esperanza).

Ctenomys boliviensis goodfellowi: Cabrera, 1961a: 546 (Esperanza). Anderson, 1985b: 14 (name in list). Anderson et al., 1987: 11. Gardner, 1988: 90 (phylogeny and parasites). Gardner and Duszinski, 1990: 810 (eimerian parasites). Gardner, 1991: 200 (La Laguna). Anderson, 1993: 42 (general distributional records).

Ctenomys boliviensis sample 4: Cook and Yates, 1994: 599 (electrophoretic study, see taxonomic note above).

Localities (2) and Specimens (4): **Santa Cruz:** 1615/6204, Esperanza, 1 BM; 1636/6242, 10 km N of San Ramón, La Laguna, 2 AM, 1 MSB.

Ctenomys leucodon Waterhouse, 1848

White-toothed Tuco-Tuco

Taxonomic Remarks: The species was at one time placed in a subgenus *Haptomys* (Thomas, 1916e: 305). This separation of the species from other *Ctenomys* has not been supported by later studies (Cook and Yates, 1994: 595), and the name *Haptomys* was not used after its initial proposal. Cook and Yates (1994: 593) suggested that "at least for species from the northwestern portion of the range of *Ctenomys*, the first two cladogenic events occurred along an east-west gradient, with *C. opimus* and then *C. leucodon* diverging."

Morphological Characters and Comparisons: Measurements in tables 18 and 21 are of specimens from 1613/6827 (BM 1901.6.7.56), 1648/6853 (AM 263028, 263029, and MSB 57192), and Comauchi (BM 13.3.18.1).

Karyology: The diploid number of chromosomes in *Ctenomys leucodon* is 36 (Cook et al., 1990: 20).

Distributional Notes: Known localities, all in the highlands in the vicinity of Lake Titicaca, are listed below and mapped in figure 770.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

Parasites: Gardner and Duszynski (1990) examined the feces of three specimens but found no eimerian oocysts.

Reproduction: In August, one female

with one embryo and seven females with no embryos were recorded.

Scientific synonym used for Bolivian specimens is:

Ctenomys leucodon Waterhouse, 1848: 281 (type locality San Andrés de Machaca, south of Lake Titicaca, department of La Paz, Bolivia). Gerrard, 1862: 182 (two from Bolivia). Thomas, 1927a: 552 (lectoparatypes). Rusconi, 1928: 239 (La Paz). Anderson, 1985b: 14 (name in list). Gardner, 1988: 90 (phylogeny and parasites). Cook, 1990: 6 (karyology). Gardner and Duszinski, 1990: 810 (negative for eimerian parasites). Cook et al., 1990: 12. Anderson, 1993: 42 (general distributional records). Ruedas et al., 1993: 450 (genome size and chromosomes). Cook and Yates, 1994: 599 (electrophoresis of allozymes).

LOCALITIES (8) AND SPECIMENS (29): **La Paz:** 1613/6827, Chilalaya, 1 BM; 1613/6827, Lago Titicaca, 1 MACN (not examined); 1644/6901, San Andrés de Machaca, 4 BM; 1648/6853, 14 km by road SW of San Andrés de Machaca, 2 AM, 1 MSB; 1658/6829, Comauchi, 1 BM; 1659/6902, 8.5 km W of San Andrés de Machaca, 1 MSB; 1700/6904, 11.5 km W of San Andrés de Machaca, 11 AM, 2 MSB; 1701/6906, 16 km W of San Andrés de Machaca, 2 AM, 2 CBF, 1 MSB.

Ctenomys lewisi Thomas, 1926

TAXONOMIC REMARKS: Based on study of allozymes, *Ctenomys lewisi* seems to be more closely related to *Ctenomys frater* than to any other species of Bolivian *Ctenomys* (Cook and Yates, 1994: 594).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from Sama (BM 26.1.1.113–125, in part.

Thomas (1926b) characterized *C. lewisi* as a large reddish brown species with unusually proodont incisors. *Ctenomys leucodon* "has similarly proodont incisors, but these are comparatively slender, are not so strongly flattened in front, and are almost unpigmented." Some measurements of the holotype (a young adult male) and of an old female were head plus body, 219 mm, 204 mm; tail, 68, 71; hind foot, 37, 37; greatest length of skull, 52, 50; condyloincisive length, 54, 51.5; zygomatic breadth, 33, 31; nasals, 17 × 9.5, 17 × 8.8; interorbital breadth, 13.5, 12.3; mastoid breadth, 29.5, 29.2; breadth across muzzle, 14, 12.8; palatilar length, 25.8, 25; and combined breadth of incisors, 9, 8.

KARYOLOGY: The diploid number of chromosomes in *Ctenomys lewisi* is 56 (Cook et al., 1990: 20).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 770.

HABITAT: Deeper soils in the Tomayapo Valley at 3450 m elevation and up to 4000 m at Sama in a tributary valley.

HABITS AND BEHAVIOR: Semi-aquatic habits of *C. lewisi* were inferred (Thomas, 1926b) on the basis of captures in holes in wet stream banks, but our more recent observations in two years provide no evidence to support this interpretation.

PARASITES: Gardner and Duszynski (1990: 805) reported the presence of eimerian oocysts in the feces of six of eight specimens of *C. lewisi*.

FOOD: No detailed study has been done.

REPRODUCTION: Two females, each with two embryos, recorded in July, as well as five with no embryo.

Scientific synonyms used for Bolivian specimens are:

Ctenomys lewisi Thomas, 1926b: 323 (type locality "Sama, 4000 m." in Tarija, Bolivia). Anderson, 1985b: 14 (name in list). Gardner, 1988: 90 (phylogeny and parasites). Lessa and Cook, 1989: 857 (1 km E of Iscayachi). Cook, 1990: 6 (karyology). Gardner and Duszinski, 1990: 810 (eimerian parasites). Cook et al., 1990: 13. Gardner, 1991: 200 (1 km E of Iscayachi). Vitullo and Cook, 1991: 360 (sperm morphology, 1 km E of Iscayachi). Anderson, 1993: 42 (general distributional records). Ruedas et al., 1993: 450 (genome size and chromosomes). Cook and Yates, 1994: 599 (electrophoresis of allozymes).

Ctenomys Lewisi: Rusconi, 1928: 247 (Sama).

Ctenomys lewisii: Biknevicius, 1993: 97 (functional anatomy, AMNH 263023).

LOCALITIES (2) AND SPECIMENS (57): **Tarija:** 2129/6457, 1 km E of Iscayachi, río Tomayapo, 18 AM, 6 MNLP, 16 MSB; 2129/6502, Sama, 14 BM, 1 KU, 2 FM.

Ctenomys minutus Nehring, 1887

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality out-

side of Bolivia. *Ctenomys minutus* was described by Nehring (1887: 47), type locality campos east of Mondo Novo, Rio Grande do Sul, Brasil. Two subspecies of *Ctenomys minutus* were recognized by Cabrera (1961a: 553), both from Brazil. One of these, *C. minutus bicolor* Miranda Ribeiro (1914: 41), occurs in Mato Grosso, which is adjacent to Santa Cruz. On the basis of size and geographic occurrence, the tentative assignment of these specimens to the species seems warranted. Subspecific assignment is not warranted without further study. Furthermore, karyotypic differences have been reported within *C. minutus*, and further study might reveal more than one species within *C. minutus* as now understood.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from the only Bolivian locality (MSB 55367, AM 260835).

KARYOLOGY: Because of their small size, the three Bolivian specimens were killed by the traps at the moment of capture, so no material for study of chromosomes was obtained.

DISTRIBUTIONAL NOTES: The only known Bolivian locality is given below and mapped in figure 770.

HABITAT: Arid scrubby vegetation at the edge of the Chaco.

HABITS AND BEHAVIOR: Inhabit shallow burrows.

FOOD: No detailed study.

REPRODUCTION: Two females with no embryos were recorded in October.

Scientific synonyms used for Bolivian specimens are:

Ctenomys minutus: Olds et al., 1987: 9 (specimens from 7 km N and 38 km W of Roboré). Anderson et al., 1987: 12 (same specimens). Lessa and Cook, 1989: 857 (one of the same three specimens). Cook et al., 1990: 13. Wilkins and Cunningham, 1993: 388 (cranial proportions, data from Anderson et al., 1987). Anderson, 1993: 42 (1816/6007).

Ctenomys minimus: Anderson, 1985b: 14 (name misspelled in list).

Ctenomys sp.: Cook and Yates, 1994: 599 (electrophoresis of allozymes).

LOCALITIES (1) AND SPECIMENS (3): **Santa Cruz:** 1816/6007, 7 km N and 38 km W of Roboré, 1 AM, 1 MNLP, 1 MSB.

Ctenomys opimus Wagner, 1848

Highland Tuco-Tuco or Tuco-Tuco Andino

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from 3.5 km E of Huancaroma (MSB 55374–55378).

KARYOLOGY: The diploid number of chromosomes in *Ctenomys opimus* is 26 (Cook et al., 1990: 20).

DISTRIBUTIONAL NOTES: Widely distributed in the Altiplano. Known localities are listed below and mapped in figure 770.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

PARASITES: Lambert et al. (1988: 1018) and Gardner and Duszynski (1990: 805) reported eimerian oocysts in the feces of 31 of 35 specimens of *C. opimus*. Four species of *Eimeria* were present and three of these were described as new. Gardner and Brant (in press) have described two new species of *Litomosoides* (Nemata) from the mesenteries of *C. opimus* from 1740/6727.

REPRODUCTION: Pregnant females (9) were recorded in August (2), October (5), and December (2). Numbers of embryos were 1 (2 cases), 2 (1), 3 (4), 4 (1), 5 (1); mean 2.8. Nonpregnant females were recorded in August (6) and September (1).

Scientific synonyms used for Bolivian specimens are:

Ctenomys opimus opimus Wagner, 1848

Ctenomys Brasiliensis Waterhouse *in* Bridges, 1846: 8 (Potosí). Waterhouse, 1848: 274 (Potosí).

Ctenomys opimus Wagner, 1848: 75 (type locality Bolivia, restricted by Thomas, 1900b: 383, to Mount Sahama, department of Oruro). Thomas, 1902b: 227 (Oruro, Challapata, Pampa Aullaga, Potosí, Livichuco). Osgood, 1916: 210 (Oruro). Neveu-Lemaire and Grandidier, 1911: 14 (Sahama). Rusconi, 1928: 239 (Bolivia). Anderson, 1985b: 14 (name in list). Gardner, 1988: 90 (phylogeny and parasites). Lambert et al., 1988: 1018 (coccidia described). Lessa and Cook, 1989: 857 (eight localities in Oruro and Potosí). Cook, 1990: 6 (karyology). Gardner and Duszinski, 1990: 810 (eimerian parasites). Salazar, 1990: 194 (Reserva "Eduardo Abaroa"). Mercado and Miralles, 1991: 295 (La Paz Valley, no specimen). Ergueta and Salazar, 1991: 37 (general summary). Gardner, 1991: 200 (5 km W and 1 km N of Pomata Ayte, río Barros). Vitullo and Cook, 1991: 360 (sperm morphology, Laguna Colorado and 7 km S and 3 km E of Cruce Ventilla). Biknevicius, 1993: 97 (functional anatomy, AMNH 244655, 260839, 260841, 263036, 263038, 263047, 263050). Ruedas et al., 1993: 450 (genome size and chromosomes). Cook and Yates, 1994: 599 (electrophoresis of allozymes). Durden and Musser, 1994: 53 (type host of *Eulinognathus bolivianus*, a sucking louse, type locality Oruro).

Ctenomys opimus opimus: Yepes, 1930: 325 ("Bolivia"). Cook et al., 1990: 16. Anderson, 1993: 42 (general distributional records). Yensen and Tarifa, 1993: 57 (1.5 km SW of Sajama).

Ctenomys sp.: Ibáñez *in* Alzerreca et al., 1982: 61 (Laguna Colorada).

LOCALITIES (30) AND SPECIMENS (167): **La Paz:** 1727/6737, Huaraco-Antipampa, 2 CBF, from owl pellets (Peñaranda); 1749/6847, Esperanza, near Mount Sahama, 5 BM, 14 FM. **Oruro:** 1739/6728, 2.5 km NE of Huancaroma, 1 AM, 2 MSB; 1740/6727, 3.5 km E of Huancaroma, 22 AM, 1 CBF, 2 MSB; 1740/6729, Huancaroma, 1 MSB; 1740/6732, 3 km W of Huancaroma, río Desaguadero, 1 MSB; 1741/6731, 11.2 km S and 0.8 km W Eucaliptus, 2 AM; 1759/6707, 2 mi [= 3.2 km] E Oruro, 1 MVZ; 1759/6709, Oruro, 9 BM, 1 US; 1807/6900, Sajama, 2 FM; 1808/6859, 1.5 km SW of Sajama, 5 CBF; 1819/6759, 5 km W and 1 km N of Pomata Ayte, río Barros, 7 AM, 3 MSB; 1825/6844, 30 km S and 25 km E of Sajama, 2 AM, 1 MSB; 1854/6647, Challapata, 4 BM; 1908/6607, 7 km S and 4 km E of Cruce Ventilla, 5 AM; 1908/6607, 6 km S and 4 km E of Cruce Ventilla, 1 MSB; 1910/6625, 45 km and 123° from Challapata, 2 AM; 1911/6705, Pampa Aullaga, 3 BM. **Potosí:** 1853/6628, Livichuco, 1 BM; 1931/6651, río Sevaruyo, 4 from owl pellets (Peñaranda); 1935/6545, Potosí, 4 ANSP, 7 BM; 1939/6540, Caricari Mountains, also spelled Karikari, 13 ANSP; 2028/6650, Uyuni, 13 ANSP; 2115/6545, Chocaya, 1 ANSP; 2210/6742, 2 km E of ENDE camp, Laguna Colorado, 3 AM, 2 MSB; 2210/6743, 10 km E of ENDE camp, 3 MNLP; 2210/6745, 7 km E of ENDE camp, Laguna Colorado, 1 AM; 2217/6701, Khastor, 1 MNLP; 2217/6747, Laguna Colorada, 13 EBD; 2218/6744, 21 km by road SE of ENDE camp, Laguna Colorado, 1 AM. **Department unknown:** coordinates uncertain, "Bolivia" only, 1 BM.

Ctenomys steinbachi Thomas, 1907

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from 1823/6313 (AM 262297) and 1713/6338 (AM 260853).

KARYOLOGY: The diploid number of chromosomes in *Ctenomys steinbachi* is 10 (Anderson et al., 1987: 15).

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 770. The name *Ctenomys steinbachi* was used by Arce Pereira et al. (1963: 151) in reference to animals in the vicinity of the río Chapare, but without specimens. No species of *Ctenomys* is known to inhabit that area.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

PARASITES: Gardner and Duszynski (1990: 805) examined 72 specimens for eimerian oocytes in the feces and found none.

REPRODUCTION: One female in August had one embryo; three in September were recorded as without embryos.

Scientific synonyms used for Bolivian specimens are:

Ctenomys Steinbachi Thomas, 1907b: 164 (type locality "Campo of Province Sara, near Santa Cruz de la Sierra, Bolivia"; restricted to "6 km N of Buen Retiro" by Anderson et al. 1987: 13). Neveu-Lemaire and Grandidier, 1911: 14 (citing Thomas). Rusconi, 1928: 243 (cited Thomas).

Ctenomys boliviensis: Krumbiegel, 1941b: 131 (Buenavista).

Ctenomys steinbachi: Cabrera, 1961a: 556. Anderson, 1985b: 14 (name in list). Anderson et al., 1987: 13. Gardner, 1988: 90 (phylogeny and parasites). Lessa and Cook, 1989: 857 (four localities in department of Santa Cruz). Gardner and Duszinski, 1990: 810 (negative for eimerian parasites). Cook, 1990: 6 (karyology). Cook et al., 1990: 20 (note on chromosomes). Gardner, 1991: 200 (3 localities in Santa Cruz). Vitullo and Cook, 1991: 360 (sperm morphology, department of Santa Cruz). Biknevicius, 1993: 97 (functional anatomy, AMNH 260851, 260853, 260856). Wilkins and Cunningham, 1993: 388 (cranial proportions, data from Anderson et al., 1987). Anderson, 1993: 42 (general distributional records). Ruedas et al., 1993: 450 (genome size and chromosomes). Anderson et al., 1993: 47 (vicinity of Santa Cruz de la Sierra). Cook and Yates, 1994: 599 (electrophoresis of allozymes). Houseal et al., 1995: 177 (chromosomes).

LOCALITIES (14) AND SPECIMENS (86): **Santa Cruz:** 1713/6338, 6 km N of Buen Retiro, 9 AM, 4 MSB; 1722/6325, campo of province of Sara, 1 BM; 1724/6351, río Surutó, 1 CM; 1727/6340, Buenavista, 3 AM, 1 ANSP, 9 BM, 2 CM, 4 FM, 3 UMMZ, 6 MACN (not examined); 1728/6341, 2 km WSW of Buena Vista, 8 MSB; 1728/6341, 2 km SW of Buena Vista, 4 MSB; 1728/6342, 4 km SW of Buena Vista, 3 MSB; 1730/6340, 6 km S of Buena Vista, 2 MSB; 1733/6332, 1.5 km SW of Caranda, 8 MSB; 1733/6332, 2 km S of Caranda, 9 MSB; 1736/6336, San Rafael de Amboró, 1 AM, 1 MSB; 1736/6336, 1 km S of San Rafael de Amboró, 1 AM; 1737/6336, 2 km S of San Rafael de Amboro, 2 AM; 1823/6313, 10 km S of Zanja Honda, 1 AM, 1 MSB. **Department unknown:** "Bolivia," 2 BM, 1 Frankfurt (Felten, in litt.).

Ctenomys, of undescribed taxa

Earlier reports on highland and lowland populations (Anderson et al., 1987; Cook et al., 1990) showed no specimens from an ecologically varied belt in the Yungas and Valles areas of the east slopes of the Andes. Subsequently, we collected tuco-tucos at several places in this hiatus. These intermediate samples are all different from each other and from any of the previously recognized Bolivian species. Further study is needed to complete the description of additional taxa.

Itahuaticua sample: Localities (1) and Specimens (32); Santa Cruz: 1948/6331, Cerro Itahuaticua, 12 AM, 8 MSB, 12 MNK.

Lluthu sample: Localities (1) and Specimens (9); Cochabamba; 1745/6459, 0.5 km S of Lluthu Pampa, 4 AM, 3 MSB, 2 CBF.

Chuhuayacu sample: Localities (1) and Specimens (23); Chuquisaca; 1943/6351, 2 km E of Chuhuayaco, 9 AM, 5 MSB, 9 CBF.

Monteagudo sample: Localities (1) and Specimens (26); Chuquisaca: 1949/6358, 2 km SW of Monteagudo, 11 AM, 7 MSB, 8 CBF.

Roca sample: Specimens recently taken north of the range of *C. goodfellowi*, perhaps darker. Localities (3) and Specimens (7); Santa Cruz; 1550/6127, Santa Rosa de la Roca, 1 MSB (63379); 1551/6127, 2 km SSE of Santa Rosa de la Roca, 1 AM (263920 + embryo), 1 MSB (63380), 2 MNK (621, 624); 1552/6127, 3 km S of Santa Rosa de la Roca, 1 AM (263921).

Roboré sample: Specimens from Santiago are placed here by geographic inference, the chromosomes not being available for study. In five specimens studied (sample 2 of Cook and Yates, 1994: 599), the diploid chromosome number is 36. The earlier report (Anderson et al., 1987: 3) of 44 chromosomes for a specimen from near San José de Chiquitos was in error. Localities (3) and Specimens (10); Santa Cruz; 1752/6031, 4 km S and 24 km E of San José de Chiquitos, 1 AM, 1 MSB; 1815/5951, 9 km N and 10 km W of Roboré, 3 AM, 2 MSB; 1819/5934, Santiago, province of Chiquitos, 3 FM.

Tapecua sample: Localities (1) and Specimens (1); Tarija; 2126/6355, Tapecua, 1 AM.

Vallegrande sample: Localities (1) and Specimens (25); Santa Cruz; 1828/6408, 5.5 km NNE of Vallegrande, río Las Cienegas, 9 AM, 5 MNK, 11 MSB.

SUBFAMILY OCTODONTINAE
WATERHOUSE, 1839

Genus *Octodontomys* Palmer, 1903

Octodontomys gliroides
(Gervais and d'Orbigny), 1844

Brush-tailed Viscacha Rat
or Rata Cola de Pincel

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from Oruro (BM 1902.2.2.3–7).

DISTRIBUTIONAL NOTES: Inhabits rocky hillsides with scattered shrubs and cacti from elevation 2200 m (Yuruma) to 4500 m (Lipez) elevation. Known localities are listed below and mapped in figure 771.

No detailed Bolivian data are available on habits, behavior, or food.

PARASITOLOGY: A flea, *Ectinorus* (*Ectinorus*) *simonsi*, was reported from Challapata

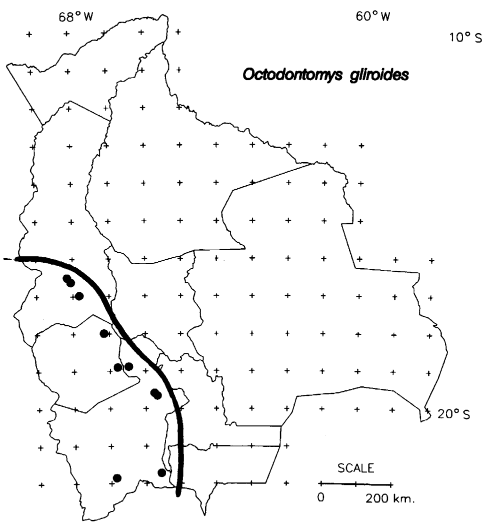


Fig. 771. Localities of known occurrence of *Octodontomys gliroides*.

(Smit, 1987: 104). A sucking louse was reported by Durden and Musser (1994: 23).

Reproduction: Young were recorded in January (2) and in May (1). Females with embryos were recorded in September (2 embryos) and October (1 embryo).

Scientific synonyms used for Bolivian specimens are:

Octodon gliroides Gervais and d'Orbigny, 1844: 22 (type locality Andes of Bolivia, near La Paz).

Neoctodon simonsi Thomas, 1902c: 115 (type locality "Potosi, 4400 m."; Bolivia); 1902b: 227 (Oruro, Challapata, Livichuco, Potosí); Smit, 1987: 106 (fleas from Challapata).

Neoctodon Simonsi: Neveu-Lemaire and Grandidier, 1911: 14 (near Lake Titicaca, Lake Poopo, Potosí, Oruro, Livichuco, Challapata).

Octodontomys gliroides: Yoneda, 1984b: 12 (Huajchilla); 1984c: 56 (Huajchilla). Anderson, 1985b: 14 (name in list). Contreras et al., 1987: 405 (map). Glanz and Anderson, 1990: 32. Mercado and Miralles, 1991: 295 (La Paz Valley). Anderson, 1993: 41 (general distributional records). Durden and Musser, 1994: 23 (type host for *Hoplopleura disgrega*, a sucking louse; "Orura" the type locality).

Localities (10) and Specimens (44): **La Paz:** 1630/6809, Andes of Bolivia, near La Paz, type locality; 1637/6803, Huajchilla, 5 EBD, 7 MNLP; 1659/6749, Caracato, 8 AM. **Oruro:** 1759/6709, Oruro, 7 BM, 1 US; 1854/6647, Challapata, 2 BM. **Potosí:** 1853/6628, Livichuco, 4 BM; 1935/6545, Potosí, 1 BM; 1939/6540, Karikari Mountains, 1 ANSP; 2143/6534, Yuruma, 5 BM, 1 MVZ; 2151/6651, Lipez, 1 BM.

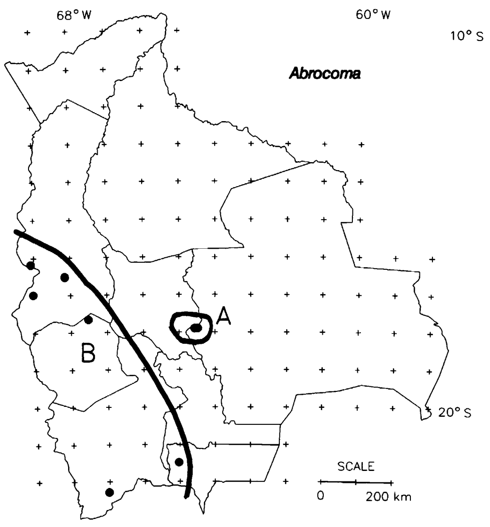


Fig. 772. Localities of known occurrence of the genus *Abrocoma*, *A. boliviensis* (A) and *A. cinerea cinerea* (B).

FAMILY ABROCOMIDAE
MILLER AND GIDLEY, 1918

Miller and Gidley (1918: 447) used the name Abrocomidae. Landry (1957: 58) used the subfamily name Abrocominae. The possibility that *Abrocoma* may be more closely related to Chinchillidae than to Octodontidae was pointed out by Glanz and Anderson (1990), but they did not formally propose reclassification at the familial level.

Genus *Abrocoma* Waterhouse, 1837

Abrocoma boliviensis
Glanz and Anderson, 1990

Bolivian Abrocoma, Abrocoma Boliviana

Taxonomic Remarks: See note under family above.

Morphological Characters and Comparisons: Measurements in tables 18 and 21 are of the only two known specimens.

Distributional Notes: Known only from the vicinity of Comarapa, see figure 772.

HABITAT: Rocky hillside near forest (Pearson fieldnotes, 1955).

No detailed data are available on habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Abrocoma sp?; Anderson, 1985b: 14 (name in list).

Abrocoma boliviensis Glanz and Anderson, 1990: 23 (type locality "Comarapa." Anderson, 1993: 42 (type locality only).

LOCALITIES (2) AND SPECIMENS (2): **Santa Cruz:** 1754/6429, Comarapa, 1 BM; 1754/6434, 5 mi [= 8 km] W Comarapa, 1 MVZ.

Abrocoma cinerea Thomas, 1919

Gray Abrocoma, Chinchillon, Rata Chinchilla Cenicienta

TAXONOMIC REMARKS: See note under family above. The name used for Bolivian specimens has its type locality outside of Bolivia. *Abrocoma cinerea* was described by Thomas (1919c: 132), type locality "Cerro Casabindo, 4800 m." in province of Jujuy, Argentina.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from Sama (5BM 26.1.1.102–112, in part).

DISTRIBUTIONAL NOTES: Widely distributed on the Altiplano. Known localities are listed below and mapped in figure 772.

HABITAT: Often inhabits stone walls.

No detailed data are available on habits, behavior, or food.

REPRODUCTION: One female had three embryos in November. One female was lactating and three young animals were taken in August.

Scientific synonyms used for Bolivian specimens are:

Abrocoma cinerea cinerea Thomas, 1919

Abrocoma cinerea: Suárez Morales, 1986: 55 (undocumented name in list). Salazar Bravo, 1990: 194 (Campamento Khastor). Mercado and Miralles, 1991: 295 (La Paz Valley). Contreras et al., 1993: 927 (penial morphology, Sama).

Abrocoma cinerea cinerea: Ellerman, 1940: 154. Anderson, 1985b: 14 (name in list). Glanz and Anderson, 1990: 21 (key to species). Anderson, 1993: 42 (general distributional records). Yensen and Tarifa, 1993: 59 (brief discussion of possible confusion with *Chinchilla*).

LOCALITIES (7) AND SPECIMENS (41): **La Paz:** 1610/6905, Copacabana, 12 MACN (not examined); 1630/6809, La Paz, 8 MACN (not examined); 1631/6809, La Paz, Tembladerani, 1 IE; 1659/6902, 8.5 km W of San Andrés de Machaca, 4 AM, 1 CBF, 1 MSB. **Oruro:** 1739/6731, Huancaroma, near Eucaliptus, 1 UMMZ. **Potosí:** 2217/6701, Khastor, 1 MNLP. **Tarija:** 2129/6502, Sama, 11 BM. **Department unknown:** perhaps Bolivia, 1 MNLP.

FAMILY ECHIMYIDAE MILLER AND GIDLEY, 1918

Subfamilies represented in Bolivia are Eumysopinae, Echimyinae, and Dactylomyinae.

No echimyid is listed as endangered or threatened under CITES.

SUBFAMILY DACTYLOMYINAE TATE, 1935

Genus *Dactylomys* I. Geoffroy Saint-Hilaire, 1838

Dactylomys boliviensis Anthony, 1920

Bolivian Bamboo Rat, Rata Boliviano de Bamboo

TAXONOMIC REMARKS: Da Silva and Patton (1993: 246) referred a specimen from the right bank Rio Purus, in Amazonas, Brazil, to *Dactylomys boliviensis* and two specimens from Centro, in Pando, Bolivia, to *D. dactylinus*. The type locality of *D. boliviensis* is in Cochabamba, as noted below. The type locality of *D. dactylinus* (Desmarest, 1817) is the upper Amazon area. However, basic questions remain unanswered. Are there two species of *Dactylomys* in Bolivia? Are *D. boliviensis* and *D. dactylomys* distinct species? Which Bolivian specimens should be referred to which species? Until a more thorough review can resolved these questions, I continue to use the name *D. boliviensis* for all of the Bolivian material.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from 1657/6524 (AM 38709, holotype), 1517/6737 (UM 126767, 127168), 1616/6733 (BM 1901.6.7.57).

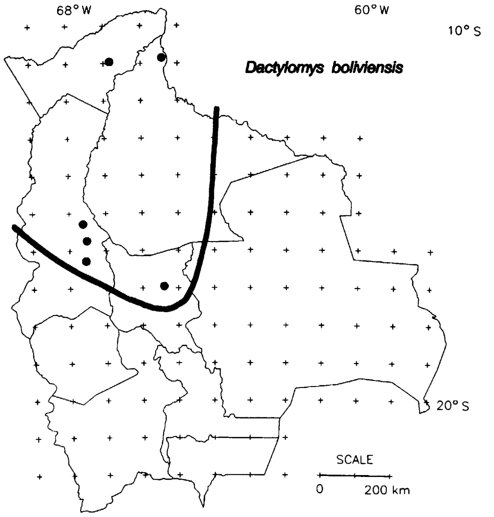


Fig. 773. Localities of known occurrence of *Dactylomys boliviensis*.

Distributional Notes: Known localities, all in tropical or subtropical lowlands, are listed below and mapped in figure 773.

Habitat: The habitat at La Reserva was described as "dense stands of bamboo (. . ., forming patches of up to 1 km^2) and small trees form[ing] a thick canopy at approximately 5 to 8 m, with an understory of intertwining branches, vines and dead leaves. In the clearings, every tree is covered with a broad leafed vine which forms a mat 3 to 5 m above the ground" (Salazar Bravo et al., 1994: 128).

Habits and Behavior: The loud and characteristic calls were heard on three nights at La Reserva "between 1900 and 0400 hours, and were more frequent between 2200 and 0245 hours" (Salazar Bravo et al., 1994: 128).

Parasitology: Brennan (1970: 810) reported the chigger, *Eutrombicula alfreddugesi*, from 4 km S of Guayaramerin.

Food: Stomach contents at La Reserva included bamboo shoots and epidermis and gnawing/tooth marks were observed on bamboo trunks (Salazar Bravo et al., 1994: 128).

Reproduction: A female with two large embryos was recorded in July at La Reserva.

Scientific synonyms used for Bolivian specimens are:

Dactylomys boliviensis Anthony, 1920: 82 (type locality "Mission San Antonio, Río Chmo re [sic. = Chimore], Prov. [= department of] Cochabamba, Bolivia; altidude 1300 feet"). Anderson, 1985b: 14 (name in list). Anderson, 1993: 41 (general distributional records). Lawrence, 1993: 148 (type locality).

Dactylomys dactylinus: Brennan, 1970: 810 (chiggers, 4 km S of Guayaramerin). Emmons and Feer, 1990: 225 (mentioned Bolivia). Emmons, 1991: 73 (seen at Alto río Madidi in La Paz department). Emmons and Smith, 1992 (Ingavi). Biknevicius, 1993: 96 (functional anatomy, AMNH 210356). da Silva and Patton, 1993: 246 (Centro, ca. 18 km NNW San Juan de Nuevo Mundo).

Localities (6) and Specimens (13): **Beni:** 1051/6525, 4 km S Guayaramerin, 1 AM. **Cochabamba:** 1657/6524, San Antonio, 1 AM. **La Paz:** 1517/6737, Libertad Sararia, 2 UMMZ (not seen); 1544/6731, La Reserva, 840 m, 4 AMNH, 1 CBF, 1 MSB; 1616/6733, Astillero, 1 BM. **Pando:** 1057/6650, Ingavi on río Orton, 2 CBF.

SUBFAMILY ECHIMYINAE GRAY, 1825

Genera represented in Bolivia are *Echimys* and *Isothrix*. For use of this subfamily see Patton and Reig (1989: 76).

Genus *Echimys* G. Cuvier, 1809

Echimys didelphoides Desmarest, 1817

Arboreal Spiny Rat

Taxonomic Remarks: Three subspecies of *Echimys armatus* (a synonym) were recognized by Cabrera (1961a: 539). The type locality of the subspecies nearest to Bolivia is in Ecuador. No subspecies name is used here, pending needed comparisons.

Morphological Characters and Comparisons: Measurements in tables 18 and 21 are of specimens from 1230/6418 (AM 210354) and 1229/6417 (AM 210355).

Distributional Notes: The two known localities are near each other on the south bank of the río Itėnez. They are listed below and mapped in figure 774.

No detailed data are available on habitat, habits, behavior, or food.

Parasitology: Brennan (1970: 811) reported the chigger, *Eutrombicula batatas*, from the mouth of the Baures River.

Reproduction: One of the two Bolivian

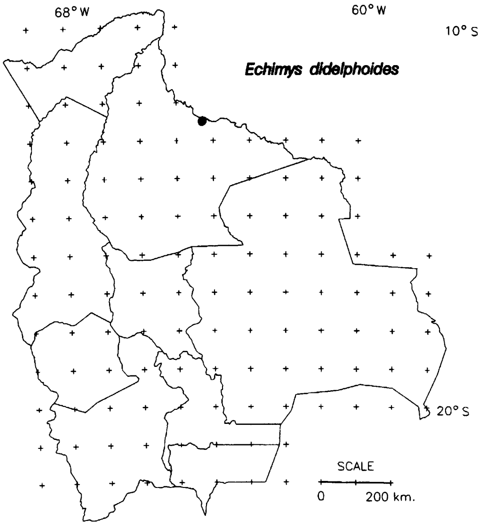


Fig. 774. Localities of known occurrence of *Echimys didelphoides.*

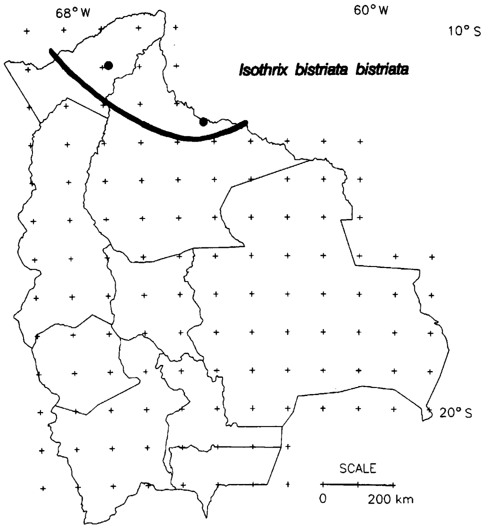


Fig. 775. Localities of known occurrence of *Isothrix bistriata bistriata.*

specimens was young (112 g, taken in October), as compared with the other specimen (282 g), taken in September.

Scientific synonyms used or usable for Bolivian specimens are:

Echimys sp.: Brennan, 1970: 811 (chiggers, mouth of Baures River).

Makalata armata: Anderson, 1985b: 14 (name in list).

Echimys armatus: Emmons and Feer, 1990: 217 (mentioned Bolivia)

Echimys armata: Anderson, 1993: 41 (two specimens noted below).

Echimys didelphoides: Emmons, 1993: 3 (use of this older name).

LOCALITIES (2) AND SPECIMENS (2): **Beni:** 1229/6417, Bolivian bank of río Iténez opposite Costa Marques [Brazil], 1 AM; 1230/6418, mouth of río Baures, 1 AM (210354).

Genus *Isothrix* Wagner, 1845

Isothrix bistriata Wagner, 1845

Rata de Doble Estría

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Isothrix bistriata* was described by Wagner (1845: 146), type locality rio Guaporé, Brazil. The distinctness of *Isothrix bistriata boliviensis* from *I. bistriata bistriata* is not established. The original description of *I. bistriata boliviensis* was based on a single young animal. The collector, date of collection, museum catalog number, and latitude and longitude were not given. No diagnostic feature distinguishing these two subspecies was given, and the subspecies nearest to *I. b. boliviensis* geographically (note the type localities) is the nominate subspecies *I. b. bistriata.* The description was "accompanied by a statement that purports to give characters differentiating the taxon," so *I. b. boliviensis* is not a nomen nudum under Article 13 of the Code (ICZN, 1985).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from 1229/6417 (AM 210353).

DISTRIBUTIONAL NOTES: Known only from the tropical lowlands. Localities are listed below and mapped in figure 775.

No detailed data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Isothrix bistriata bistriata Wagner, 1845

Isothrix bistriata: Waterhouse, 1848: 329. Pelzeln, 1883: 61 (opposite Liomil). Emmons and Feer, 1990: 221 (mentioned Bolivia). Emmons and Smith, 1992 (Ingavi). Biknevicius, 1993: 96 (functional anatomy, AMNH 210353).

Isothrix bistriata boliviensis Petter and Cuenca Aguirre, 1982: 199 (type locality Barranca Colorado, "au borde de la riviere Saint-Louis, sud-est du Beni").

Isothrix bistriata bistriata: Patton and Emmons, 1985: 12. Anderson, 1985b: 14 (name in list). Anderson, 1993: 41 (general distributional records). da Silva and Patton, 1993: 249 (Centro).

LOCALITIES (3) AND SPECIMENS (3): **Beni:** 1229/6417, Bolivian bank of río Iténez opposite Costa Marques [Brazil], 1 AM; coordinates uncertain, Barranca Colorada, 1 MNH (Paris). **Pando:** 1057/6650, Ingavi on río Orton, 1 CBF.

SUBFAMILY EUMYSOPINAE RUSCONI, 1935

For use of this subfamily, see Patton and Reig (1989: 76). Genera represented in Bolivia are *Mesomys*, *Proechimys*, and *Thrichomys*.

Genus *Mesomys* Wagner, 1845

Mesomys hispidus (Desmarest), 1817

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Echimys hispidus* was described by Desmarest (1817: 58); type locality South America restricted by Tate (1939: 179) to Borba, on the Madeira River, Amazonas, Brazil. Da Silva and Patton (1993: 249) noted that "the name *hispidus* applies to those clades of the Rio Jurua and western Amazonia," including the specimen from Moira Camp. They also noted that "it is possible to assign three of the haplotype clades to separate species on phylogenetic grounds" and the two Bolivian specimens examined were in different clades. However, the authors did not proceed to assign these to different species and indicated that a "formal revision of the genus has never been accomplished."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of TTU 34988 from 1 mi W of Puerto Linares. The skull was measured by Steve Williams.

DISTRIBUTIONAL NOTES: The three known localities are in the tropical lowlands at elevations below 300 m. These localities are listed below and mapped in figure 776.

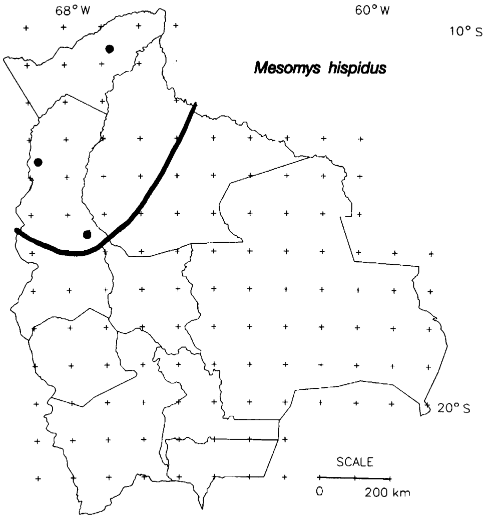


Fig. 776. Localities of known occurrence of *Mesomys hispidus*.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

The only scientific name used for Bolivian specimens is:

Mesomys hispidus: Emmons, 1991: 73 (Alto río Madidi in La Paz department). Emmons and Smith, 1992 (Centro Diesiocho). da Silva and Patton, 1993: 245 (Moira Camp, Centro). Emmons, 1994: 149 (Alto Madidi, Baraca San Juan de Nuevo Mundo).

LOCALITIES (3) AND SPECIMENS (4): **La Paz:** 1335/6846, Moire Camp, río Madidi, 1 CBF, 1 US; 1529/6731, 1 mi [= 1.6 km] W of Puerto Linares, 1 TTU. **Pando:** 1036/6647, Centro Diesiocho, 1 US (Emmons and Smith, 1992).

Genus *Proechimys* Allen, 1899

James L. Patton and coworkers have advanced our knowledge of *Proechimys* taxonomy (Patton and Gardner, 1972; Patton and Reig, 1989; Patton and Rogers, 1983; Patton, 1987). More revisions are needed. I have not restudied a number of specimens studied before the above revisions (and especially before Patton, 1987) and so have listed these without specific assignment below. My current and tentative taxonomic hypothesis is that all Bolivian *Proechimys* not here identified to species will eventually be assigned to one of the four following species. This hypothesis is subject to revision if further study reveals additional species in Bolivia. Considering the uncertainty about species, the use of subspecies names would be of little help until geographic variation is better known.

Vernacular names for *Proechimys* are Spiny Rat or Rata Espinosa; however these are also applied to some other genera.

PARASITOLOGY: Brennan (1970: 810) reported the chigger *Eutrombicula goeldii* from *Proechimys* sp. from Versalles (= AM 210344).

Proechimys brevicauda Gunther, 1876

Short-tailed Spiny Rat

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Proechimys brevicauda* was described by Gunther (1876: 74), type locality Chamicuros, río Huallaga, Peru. I am perplexed by the use of *brevicauda* and *longicaudatus* in *Proechimys*. The Greek work for "mouse," Latinized as *Mus*, is of masculine gender. If *brevicauda*, meaning "short-tail," is a noun in apposition, then why would not *longicaudatus* be also, and if so, then why not *longicaudata*? My personal preference would be for the Code to be changed so that the original spellings would be retained, regardless of gender.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from near San Antonio (AM 5 M, 2 F), 1144/6647 (AM 263054), 1101/6612 (AM 263055), 1123/6712 (AM 263056), and 1124/6713 (AM 263057), and 1657/6524 (AM 38755–38762).

The baculum in the *longicaudatus*-group was reported (Patton, 1987: 316) to be

> elongate and broad, with well-developed apical wings . . . The margins are concave and the proximal and distal ends are usually about equal in width. In some specimens, the proximal end bears a median indentation of variable depth; in others, the proximal base is evenly rounded. The shaft is arched dorsally from base to tip and transversely concave along its entire length . . . samples allocated to *P. brevicauda* average larger and broader in the northern . . . than in more southern localities (e.g. southeastern Peru and adjacent Bolivia); samples from southeastern Bolivia and adjacent Brazil referred to *P. longicaudatus* approach the general size of northern samples of *P. brevicauda*.

The incisive foramen in the *longicaudatus*-group was reported (Patton, 1987: 323) to be diagnostic in "a lyre-shaped foramen, usually with a strongly constricted posterior portion; the maxillary terminus of the foramen deeply grooved onto the anterior palate; the posterolateral margins of the foramen strongly flanged; an expanded, long premaxillary portion of the septum, usually extending more than one-half its length; a well-developed and strongly keeled maxillary portion of the septum . . . , the maxillary keel extending onto the anterior palate resulting in a well-developed median ridge; and a vomerine portion of the septum exposed ventrally between the premaxillary and maxillary components."

A third cranial area, the temporal, in the *longicaudatus*-group was reported (Patton, 1987: 323) to "show some ridge development while taxa of the . . . *simonsi* . . . groups characteristically do not." A fourth cranial area, the ventral part of the canal of the infraobital foramen, was reported (Patton, 1987: 328) to exhibit the least development of a groove in the *longicaudatus*-group (and several other groups that do not occur in Bolivia) and to show moderate develpment in the *goeldii* and *simonsi*-groups. A fifth cranial area, the mesopterygoid fossa, was reported (Patton, 1987: 330) to "consistently have the broadest angle with the most shallow fossa" in the *longicaudatus*-group and, in comparison, the *simonsi*-group to have "the most acutely angled fossa and, . . . the deepest penetration into the palate." Patton's figure 23 shows *P. steerei* to resemble *P. simonsi* in this regard.

Finally, the counterfold pattern of the cheekteeth in different species-groups was compared by Patton (1987: 330) in individuals of age-classes 8 and 9 (as defined by Patton and Rogers, 1983). The average number of folds differs somewhat from group to group, and in some cases from place to place within a group. "Taxa of the *simonsi*-group are somewhat intermediate between the *goeldii* and *longicaudatus*-groups in fold number" (Patton, 1987: 336), the highest numbers being in the *goeldii*-group. "Samples referred to *P. longicaudatus* are characterized by only two folds on the last molar; specimens referred to *P. brevicauda* typically

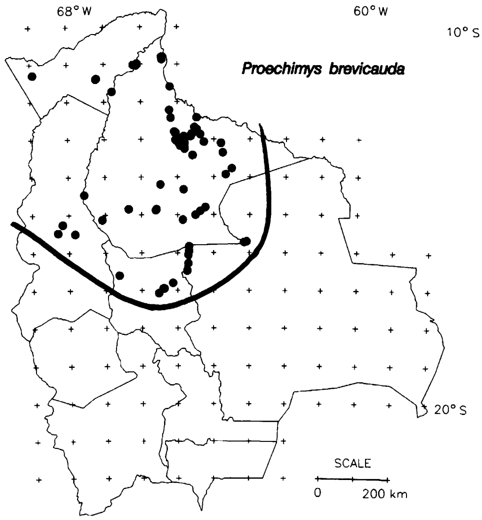


Fig. 777. Localities of known occurrence of *Proechimys brevicauda.*

have the first and second medial folds on m_3 displaying degrees of coalescence."

DISTRIBUTIONAL NOTES: Widely distributed in tropical and subtropical lowlands. Known localities are listed below and mapped in figure 777.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

PARASITOLOGY: Brennan (1970: 811) reported three species of chigger, *Colicus johnsoni, Polylopadium aspasium,* and *Trombicula dunni,* all from opposite Principe da Beira (1225/6428). Yunker and Brennan (1964) reported four chiggers (*Miyatrombicula arandiae, Euschoengastia kunsi, E. mackenziei,* and *E. johnsoni*) taken from *Proechimys guyannensis* at San Joaquín.

Scientific synonyms used for Bolivian specimens are:

Proechimys brevicauda: Anderson, 1985b: 14 (name in list). Biknevicius, 1993: 96 (functional anatomy, AMNH 214662, 214682, 214683, 214689, 214691, 247907). Anderson, 1993: 41 (general distributional records).

Proechimys bolivianus Thomas, 1901c: 537 (type locality Mapiri, department of La Paz, Bolivia). Neveu-Lemaire and Grandidier, 1911: 15 (Mapiri). Woods (*in* Wilson and Reeder, 1993: 795).

Proechimys cayennensis bolivianus: Ellerman, 1940: 121 (Mapiri).

Proechimys guyannensis bolivianus: Cabrera, 1961a: 519 (Mapiri).

Proechimys sp.: Brennan, 1970: 811 (chiggers, 1225/6428).

Patton (1987: 309) listed *P. brevicauda* and *P. boliviensis,* a misspelling of *bolivianus,* as members of the *longicaudatus*-group, but did not indicate their specific status. Bolivian localities for the species-group were mapped (and listed on p. 342). Most of the specimens listed below were identified by J. L. Patton.

LOCALITIES (73) AND SPECIMENS (485): **Beni:** 1048/6526, 1 mi [= 1.6 km] NW Guayaramerin, 5 AM; 1049/6525, Guayaramerin, 2 AM; 1052/6525, 5 km S Guayaramerin, 2 AM; 1059/6606, Riberalta, 2 FM, 4 US; 1136/6512, 6 km S Buena Hora [Brazil], 1 AM; 1144/6647, boca del río Biata, 1 AM; 1213/6513, bank of río Mamoré opposite Cascajal, 2 AM; 1225/6428, bank of río Iténez opposite Principe da Beira [Brazil], 3 AM (210350—210352); 1226/6511, río Mamoré, 1 AM; 1241/6432, 15 km above Horquilla on río Machupo, 1 AM; 1244/6428, Las Peñas, 1 US; 1248/6505, Puerto Siles, 1 FM; 1249/6503, Cinco, 7 FM; 1249/6504, 2 km SE Puerto Siles, 5 AM; 1251/6436, La Esperanza, 42 km NE San Joaquín, 1 US; 1252/6422, Huchulu, 1 US; 1255/6438, Pampitas, 1 US; 1255/6449, Caravana, 16 FM; 1258/6459, Azunta, 27 FM; 1259/6453, Filadelfia, 7 FM; 1301/6503, Providencia, 1 FM; 1304/6449, San Joaquín, 4 AM, 89 FM, 12 US; 1304/6416, Acapulco, 1 FM; 1305/6459, San Pablo, 8 FM; 1306/6348, Buenavista, 1 FM; 1306/6448, San Juan, 3 FM; 1310/6455, Veintidos, 1 FM; 1310/6449, San Marco, 20 FM; 1313/6448, Barranquita, 3 FM; 1315/6448, Yutiole, 1 AM; 1325/6435, Cafetal, 4 US; 1346/6330, Lago Victoria, 14 FM, 1 US; 1356/6340, El Carmen, 2 FM; 1412/6528, Fortaleza, province of Yacuma, 2 US; 1420/6450, San Pedro, 3 FM; 1315/6448, Yutiole, 1 AM; 1321/6345, El Mojon, 4 FM; 1428/6734, Rurrenabaque, 1 AM; 1448/6414, Casarabe, 1 AM; 1451/6535, 3.6 km NNE San Ignacio de Moxos, 9 US; 1451/6621, Estación Biológica del Beni, 2 AM, 1 MSB; 1451/6621, Totaisal, 1 km SW of Estación Biológica del Beni, 2 AM, 4 MSB; 1453/6536, San Ignacio, province of Moxos, 45 US; 1454/6422, 6 km W Casarabe, 1 AM; 1500/6430, San Andrés, 2 FM; 1508/6451, 10 km E San Antonio, 1 AM; 1508/6705, 4 km N of Yacuma, 5 AM, 1 MSB; 1550/6441, 5 km NE of mouth of río Grande, 5 AM; coordinates uncertain, Arruda, 3 FM; coordinates uncertain, Centenela, 2 FM; coordinates uncertain, Las Pavas, 6 FM; coordinates uncertain, Santo Dios, 10 FM; coordinates uncertain, Tapera Jorillo, 3 FM. **Cochabamba:** 1636/6637, Charuplaya, 6 BM; 1648/6508, Todos Santos, 13 AM, 3 FM (species uncertain); 1657/6522, 4 km SE Villa Tunari, 2 UMMZ; 1657/6523, 2 km E Villa Tunari, 2 AM; 1657/6524, San Antonio, 8 AM; 1704/6531, San Rafael, 19 km SW Villa Tunari, 1 UMMZ; **La Paz:** 1515/6810, Mapiri, San Ernesto, 4 AM, 9 BM; 1528/6818, Ticunhuaya, 5 AM; 1530/6750, 5 km SE Guanay, río Challana, 2 UMMZ. **Pando** 1101/6612, Agua Dulce, 1 AM; 1102/6607, Las Piedras, 1 AM; 1117/6855, río Nareuda, 2 AM; 1123/6712, Bella Vista, 1 AM; 1124/6713, La Cruz, 1 AM. **Santa Cruz:** 1542/6305, Ascension de Guarayos, 12 FM; 1543/6309, 6 km by road W of Ascención, 9 AM, 5 MSB; 1557/6441, río Ichilo, 2 km N of mouth of río Chapare, 3 AM; 1603/6442, río Ichilo, 9 km S of mouth of río Chapare , 2 AM; 1617/6442, río Ichilo, 34 km S of mouth of río Chapare, 3 AM; 1628/6444, río Ichilo, 52 km S of mouth of río Chapare, 2 AM; 1629/6444, río Ichilo, 54 km S of mouth of río Chapare, 16 AM. **Department unknown:** Bolivia only, 3 BM.

Proechimys hilda Thomas, 1924

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Proechimys hilda* was described by Thomas (1924a: 534), type locality "San Lorenzo, Alt. 500′," río Marañon near mouth of río Huallaga, Peru. The source of the name *hilda* was not given in the original description.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from 1110/6522 (AM 214670) and Peru (BM 24.2.22.12).

The baculum of the *goeldii*-group, to which *P. hilda* and *P. steerei* belong, was reported (Patton, 1987: 315) to be "similar to that described for members of the *guyannensis*-group [none of which are thought to occur in Bolivia]. At similar cranial ages, it is nearly the same length but slightly wider both basally and distally, giving the baculum a somewhat stouter appearance. The base varies in shape from rounded to bilobed with a median notch, the sides are parallel to only slightly concave, and the tip shows only faint development of apical wings and a median depression. In lateral view, the baculum is straight to slightly convex dorsally and concave ventrally."

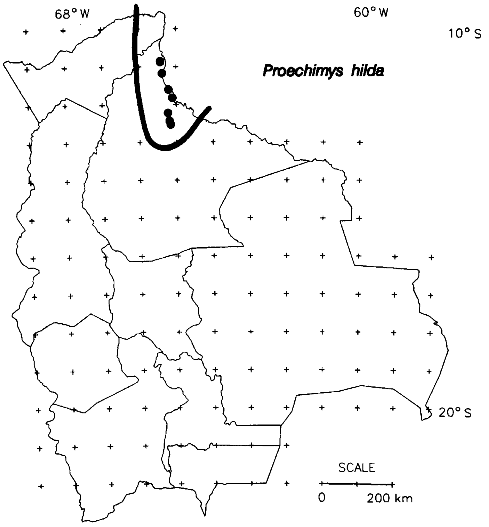


Fig. 778. Localities of known occurrence of *Proechimys hilda.*

The incisive foramen in the *goeldii*-group was reported (Patton, 1987: 323) to be

> usually only weakly lyre-shaped, or with margins tapering slightly posteriorly or parallel-sided. The premaxillary portion of the septum is short, usually one-half or less of the length of the foramen; the maxillary portion varies greatly, being usually rather weak and attenuate, often not in contact with the premaxillary portion . . . but sometimes broadly spatulate and filling much of the foramen . . . the vomer is only rarely exposed ventrally, being completely enclosed in the premaxillary sheath. The maxillary portion of the septum often exhibits a median vacuity . . . ; it may be slightly ridged, but is never strongly keeled, and seldom does this ridge extend onto the anterior palate . . . thus, there are only moderately developed grooves onto the anterior palate, and the posterolateral margins of the foramen are only moderately flanged.

DISTRIBUTIONAL NOTES: Known localities, along the río Mamoré in northern Beni, are listed below and mapped in figure 778.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

PARASITOLOGY: Brennan (1970: 811) reported the chigger, *Colicus kunsi*, from the Mamoré River (= AM 210348).

REPRODUCTION: One female without embryos was recorded in October.

The only scientific name used for Bolivian specimens is:

Proechimys hilda: Anderson, 1985b: 14 (name in list). Biknevicius, 1993: 96 (functional anatomy, AMNH 210348, 214665). Anderson, 1993: 41 (general distributional records).

Patton (1987: 308) listed *P. hilda* as a member of the *goeldii*-group, but did not explicitly indicate the specific status of *P. hilda*. Bolivian localities for the species-group were mapped (and listed on p. 341). Most of the specimens listed below were identified by J. L. Patton. *Proechimys hilda* was considered to be a synonym of *Proechimys semispinosus* (Tomes, 1860) by Woods (*in* Wilson and Reeder, 1993: 798).

LOCALITIES (8) AND SPECIMENS (10): **Beni:** 1051/6525, 4 km S of Guayaramerin, 1 AM; 1052/6525, 5 km S of Guayaramerin, 1 AM (210348, on Mamoré River); 1110/6522, 4 km below San Cruz, río Mamoré, 2 AM; 1136/6512, 6 km S Buena Hora [Brazil], 1 AM; 1149/6506, 7 km N Lagoinha, 2 AM; 1213/6513, bank of río Mamoré opposite Cascajal, 1 AM; 1226/6511, río Mamoré, 1 AM; 1232/6509, 17 km NNW Nuevo Berlin, 1 AM.

Proechimys longicaudatus (Rengger, 1830)

Long-tailed Spiny Rat

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Echimys longicaudatus* was described by Rengger (1830: 236), type locality Paraguay.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from Estación Pailón (AM 260781–260787, MSB 55384–55386), Charuplaya (BM 1902.1.1.100), 1724/6351 (BM 23.12.12.12 and CM 4967), and San Ramón (AM 262324–262329, in part). See the account of *P. brevicauda* for comparisons of species-groups in characters of the baculum and incisive foramen.

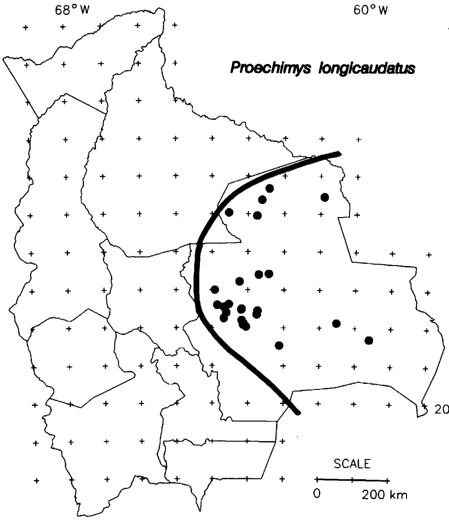


Fig. 779. Localities of known occurrence of *Proechimys longicaudatus*.

DISTRIBUTIONAL NOTES: Widely distributed in the lowlands of Santa Cruz. Known localities are listed below and mapped in figure 779.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

PARASITOLOGY: Three species of fleas were reported: *Polygenis* (*Gephyropsylla*) *klagesi samuelis* from Buen Retiro (Smit, 1987: 250); *Polygenis* (*Polygenis*) *roberti beebei* from Buen Retiro (Smit, 1987: 281); and *Polygenis* (*Polygenis*) *bohlsi bohlsi* from Buen Retiro (Smit, 1987: 296).

REPRODUCTION: Females with embryos were recorded in March (2 embryos) and in August (4). A young individual was recorded in June. Females without embryos were recorded in January (1), March (1), April (1), May (1), June (1), and September (2).

Scientific synonyms used for Bolivian specimens are:

Proechimys longicaudatus longicaudatus: Smit, 1987: 250, 281, 296 (fleas from Buen Retiro).

Proechimys longicaudatus: Anderson, 1993: 41 (general distributional records). Anderson et al., 1993: 46 (vicinity of Santa Cruz de la Sierra).

Patton (1987: 308) listed *P. longicaudatus* as a member of the *longicaudatus*-group, but did not explicitly indicate its specific status. Bolivian localities for the species-group were mapped (and listed on p. 342). Most of the specimens listed below were identified by J. L. Patton.

LOCALITIES (30) AND SPECIMENS (153): **Santa Cruz:** 1420/6225, PRNB, 5 MNK; 1433/6054, 3 km E of Camp "los Fierros," 1 MNK, 1 MSB; 1438/6237, Perseverencia, 1 MNK; 1458/6332, Laguna Pajaral, 3 MNK; 1503/6245, río Negrillo, 3 MNK; 1635/6225, San Ramón, Castedo, 18 MNK; 1636/6242, 10 km N of San Ramón, 6 AM, 3 MSB; 1647/6314, Estancia Cachuela Esperanza, 3 AM; 1700/6355, Ayacucho, 2 AM, 1 CENETROP; 1723/6332, San Miguel Rincón, 1 AM, 1 MSB; 1724/6351, río Surutú, 1 BM, 3 CM; coordinates uncertain, Cerro Hosana, 7 CM, 1 FM; 1727/6340, Buenavista, 11 BM, 2 CM, 4 FM, 3 MACN (not examined); 1730/6310, Juan Latino, 13 km NNW Warnes, 1 US; 1730/6310, Warnes, 2 US; 1730/6310, 1.3 km NE Warnes, 6 US; 1730/6310, 1 km NNW Warnes, 9 US; 1731/6311, Santa Rosita, 3 km SW Warnes, 14 US; 1733/6244, 8 km N and 1 km E of Pailón, 1 MNK; 1736/6336, San Rafael de Amboró, 1 AM; 1739/6245, 3.5 km W of Estación Pailón, 7 AM, 3 MSB; 1745/6340, 4.5 km N and 1.5 km E of Cerro Amboró, río Pitasama, 1 MSB; 1748/6310, Santa Cruz de la Sierra, 2 CM; 1752/6031, 4 km S and 24 km E of San José de Chiquitos, 5 AM; 1753/6307, 15 km S of Santa Cruz, 1 AM, 1 CBF, 1 MNK, 4 MSB; 1755/6308, 15 km S of Santa Cruz, 2 MSB; 1758/6303, 27 km SE of Santa Cruz, 2 MSB; 1818/5936, 4 km N and 1 km W of Santiago de Chiquitos, 4 AM, 2 MSB; 1828/6207, 8 km SE of Tita, 1 AM; coordinates uncertain, Florida, near Floripondio, 2 FM.

Proechimys simonsi Thomas, 1900

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Proechimys simonsi* was described by Thomas (1900d: 300), type locality "Perené River, Junin Province, Peru."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from 1620/6645 (AM 38763), 1101/6612 (AM 263059), 1213/6824 (AM 263061, 263062), and 1117/6855 (AM 249060).

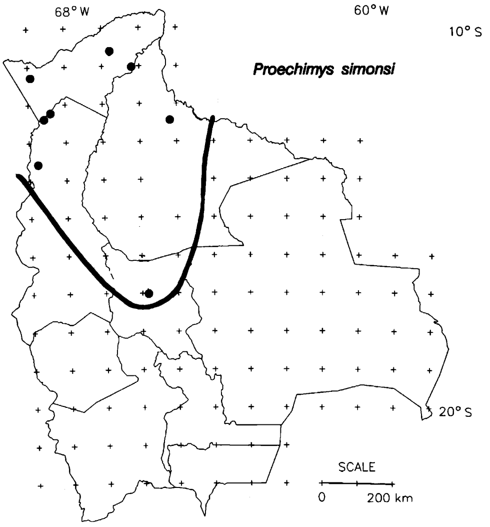


Fig. 780. Localities of known occurrence of *Proechimys simonsi.*

The baculum in the *simonsi*-group was reported (Patton, 1987: 315) to be "elongate and narrow, with a rounded and slightly broadened base. In older specimens the base is often laterally expanded with thin wings of bone. The weakly espanded distal end is usually characterized by a small lateral platform on each side separated by a shallow median depression."

The incisive foramen in the *simonsi*-group was reported (Patton, 1987: 324) to be

> oval in general shape, although often asymmetrical in anteroposterior direction . . . the premaxillary portion of the septum is rather short, usually no more than one-half the length of the foramen. The maxillary portion is usually weak and attenuate, only rarely in contact with the premaxillary portion. When the septum is complete . . . the vomer is either completely enclosed by the premaxillary or barely visible . . . the posterolateral margins are flat, not flanged, and no groove extends onto the anterior palate. Rather, the palate is noticeably flat and smooth, without a medial ridge.

DISTRIBUTIONAL NOTES: Scattered in the tropical and subtropical lowlands. One record from the Yungas of Cochabamba at 3600 ft [= 1110 m] elevation, however Patton noted that the skin looks like *P. simonsi*, but the skull was not seen. Known localities are listed below and mapped in figure 780.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

The only scientific name used for Bolivian specimens is:

Proechimys simonsi: Anderson, 1985b: 14 (name in list). Patton, 1987: 307, 344 (map; río Mamoré, yungas of Cochabamba, río Nareuda). Emmons and Smith, 1992 (Centro Dieciocho). Emmons, 1991: 73 (Alto rio Madidi). Anderson, 1993: 41 (general distributional records).

Patton (1987: 308) listed *P. simonsi* as a member of the *simonsi*-group, but did not explicitly indicate its specific status. Bolivian localities for the species-group were mapped (and listed on p. 344). Most of the specimens listed below were identified by J. L. Patton.

LOCALITIES (8) AND SPECIMENS (13): **Beni:** 1226/6511, río Mamoré, 1 AM. **Cochabamba:** 1700/6550, Yungas, 1 AM. **La Paz:** 1335/6846, Moira Camp, Alto río Madidi, 1 CBF, 1 USNM. **Pando** 1036/6647, Centro Dieciocho, 1 CBF, 2 US (Emmons and Smith, 1992); 1101/6612, Agua Dulce, 1 AM; 1117/6855, río Nareuda, 1 AM; 1213/6824, Santa Rosa, 3 AM; 1223/6835, Isla Gargantua, 1 AM.

Proechimys steerei Goldman, 1911

TAXONOMIC REMARKS: The name used for Bolivian specimens has its type locality outside of Bolivia. *Proechimys steerei* was described by Goldman (1911: 238), type locality "Rio Purus, a southern tributary of the Amazon, in northwestern Brazil."

MORPHOLOGICAL CHARACTERS AND COMPARISONS: Measurements in tables 18 and 21 are of specimens from La Cruz (AM 263078–263086), 1123/6712 (AM 263067—263068), and 1126/6734 (AM 263073–263075). See the account of *P. hilda* for characters of the baculum and incisive foramen in the the *goeldii*-group.

DISTRIBUTIONAL NOTES: Occurs in the tropical lowlands of northern Bolivia up to at least 270 m at Moira Camp. Known localities are listed below and mapped in figure 781.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

REPRODUCTION: Young individuals were taken in May (1) and in July (4, only two pair of upper molars had erupted).

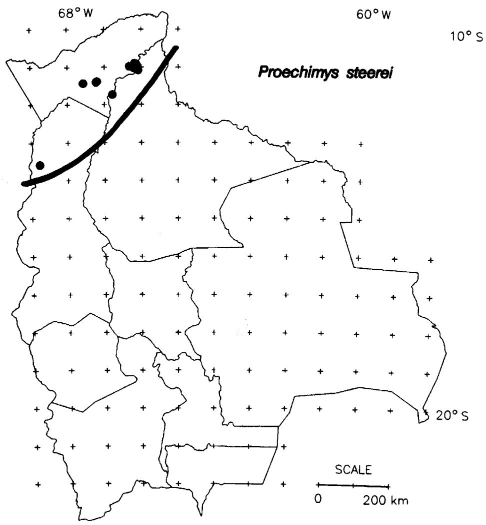


Fig. 781. Localities of known occurrence of *Proechimys steerei.*

The only scientific name used for Bolivian specimens is:

Proechimys steerei: Patton, 1987: 308, 341 (map, 11 localities in Beni). Emmons, 1991: 73 (Alto río Madidi). Anderson, 1993: 41 (general distributional records).

Patton (1987: 308) listed *P. steerei* as a member of the *goeldii*-group, but did not explicitly indicate the specific status of *P. steerei.* Bolivian localities for the species-group were mapped (and listed on p. 341). Most of the specimens listed below were identified by J. L. Patton.

LOCALITIES (15) AND SPECIMENS (71): **Beni:** 1059/6606, Riberalta, 24 US; 1059/6614, 13 km W of Riberalta, 11 (Patton, 1987); 1144/6647, boca del río Biata, 1 AM. **La Paz:** 1335/6846, Moira Camp, Alto río Madidi, 1 CBF. **Pando** 1054/6611, 13 km NW Riberalta on S bank of río Madre de Dios, 2 US; 1056/6608, 5 km NW of Riberalta on N bank of río Madre de Dios, 4 US; 1057/6608, 3.5 km NW of Riberalta on NW bank of río Beni, 3 US; 1059/6619, río Madre de Dios, 1 AM; 1101/6606, W bank río Beni, opposite Hamburgo, 2 AM; 1101/6612, Agua Dulce, 3 AM; 1102/6607, Las Piedras, 1 AM; 1123/6712, Bella Vista, 3 AM; 1124/6713, La Cruz, 9 AM; 1126/6734, Independencia, 1 AM; 1126/6734, right bank río Madre de Dios, opposite Independencia, 5 AM.

Proechimys, species not determined

Scientific synonyms used for Bolivian specimens are:

Proechimys securus Thomas, 1902a: 140 (type locality Charuplaya, río Sécure, department of Cochabamba, Bolivia). Neveu-Lemaire, and Grandidier, 1911: 15 (Charuplaya).

Proechimys brevicaudus securus: Osgood, 1915: 209 (Todos Santos).

Proechimys cayennensis securus: Ellerman, 1940: 121 (Charuplaya).

Proechimys longicaudatus securus: Moojen, 1948: 316 (Charuplaya). Cabrera, 1961a: 526 (Charuplaya).

Proechimys spp.: Stearman, 1990: 380 (Yuqui camp at 1647/6457).

Proechimys sp?: Emmons and Smith, 1992 (0952/6542). Anderson, 1993: 41 (general distributional records).

LOCALITIES (70) AND SPECIMENS (202): **Beni:** 1053/6600, 13 km NE Riberalta, south bank río Beni, 6 US; 1055/6602, 10 km NNE Riberalta, 1 US; 1144/6647, boca del río Biata, 2 AM, 6 MSB; 1244/6318, Versalles, río Iténez, 1 AM (210344); 1301/6511, Santa Rosa, 1 FM; 1333/6429, Chaco Maiz, 1 MSB; 1350/longitude unknown, La Colonia, río Negro, 3 IML; 1439/6617, campamento Busurucucú, 1 IE, 1 MNLP; 1442/6704, 45 km N of Yacuma, 1 MSB; 1444/6615, campamento Busurucucú, 1 CBF; 1446/6621, La Pascana, 1 IE; 1448/6619, campamento El Trapiche, 1 AM, 2 MNLP; 1450/6623, río Curiraba, 1 MNLP; 1451/6621, Estación Biológica del Beni, 1 IE; 1452/6707, Km 35 NW of Yucumo, 3 AMNH, 1 CBF, 1 MSB; 1453/6536, 1 km SW San Ignacio de Moxos, 6 US; 1517/6704, Serranía de Pilón, 1 AM, 6 MSB; coordinates uncertain, Alto Beni?, 1 AM. **Chuquisaca:** 1911/6430, Tomina Province, 2 US. **Cochabamba:** 1558/6442, mouth of río Chapare, 1 ANSP; 1636/6637, Charuplaya, 6 BM; 1640/6603, Mosetenes, 1 BM; 1642/6449, río Ichilo, 2 km N of mouth of río Chimoré, 1 AM; 1647/6457, Campamento Yuqui, 4 MNLP; 1657/6523, Balneario del hotel Las Pozas, 1 EBD; 1704/6529, 12.5 km SW of Villa Tunari, Parque Nacional Carrasco, 1 MSB; 1706/6529, El Palmar, Chapare province, 5 FM, 7 MACN (not examined); 1706/6533, El Palmar, río Cochi Mayu, 4 AM, 2 CBF, 1 MSB. **La Paz:** 1227/6737, río Manupare, 1 MNLP; 1304/6711, río Beni, 1 AM; 1315/6718, río Beni, 2 AM; 1333/6800, Ixiamas, Aserradero San Francisco, 5 MNLP; 1401/6731, río Beni, 1 AM; 1529/6731, 1 mi [= 1.6 km] W Puerto Linares, 1 MSU, 3 TTU; 1541/6730, Serranía Bella Vista, 1 AM; 1542/6735, 20 km by road NNE Caranavi, 1 UMMZ; 1544/6731, La Reserva, 840 m, 1 AMNH, 1 CBF, 1 MSB; 1546/6736, Caranavi, 5 MSU; 1609/6745, Chijchijpa, 1114 m, 1 MSB. **Pando** 0952/6542, main camp on río Negro, 2 CBF, 2 US (Emmons and Smith, 1992; perhaps of a new species); 1056/6618, Remanso, 1 MSB; 1059/6607, 2.3 km W Riberalta, 1 US; 1059/6619, left bank of río Madre de Dios, 1 AM, 3 MSB; 1101/6606, W bank río Beni, opposite Hamburgo, 1 MSB; 1101/6612, Agua Dulce, 1 AM, 4 MSB; 1102/6607, Las Piedras, 2 MSB; 1112/6640, left bank río Madre de Dios, 1 AM; 1120/6658, mouth of Arroyo Canada, 1 MSB; 1123/6712, Bella Vista, 1 AM, 4 MSB; 1124/6713, La Cruz, 1 AM, 6 MSB; 1126/6734, Independencia, 1 MSB; 1126/6734, right bank río Madre de Dios, opposite Independencia, 2 MSB; 1142/6756, Palmira, 1 MSB; 1150/6845, Manuripi Heath National Wildlife Reserve, 2 MNK; 1213/6824, Santa Rosa, 2 MSB; 1223/6835, Isla Gargantua, 1 AM, 3 MSB. **Santa Cruz:** 1433/6053, Los Fierros, 1 EBD; 1558/6441, mouth of río Chapare, 1 ANSP; 1623/6059, San Ignacio de Velasco, 13 US; 1637/6246, near río Quiser (probably), 1 CM; 1649/6237, Palmarito, río San Julian, 4 CM; 1721/6302, 2 km N La Abra, 18 km NE Warnes, 2 US; 1722/6325, province of Sara, 1 BM; 1724/6346, río Yapacaní, 1 MACN (not examined); 1724/6351, río Surutú, 1 MACN (not examined); 1753/6307, 15 km S of Santa Cruz, 4 MSB; 1753/6307, 15 km S of Santa Cruz (AM 264480); 1808/6312, 7 km E and 3 km N Ingeniero Mora, 2 AM; coordinates uncertain, Nueva Moka, 3 MACN (not examined). **Department unknown:** "Bolivia" only, 1 ANSP, 7 MACN (not examined).

Genus *Thrichomys* Trouessart, 1880

Thrichomys apereoides (Lund), 1839

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities

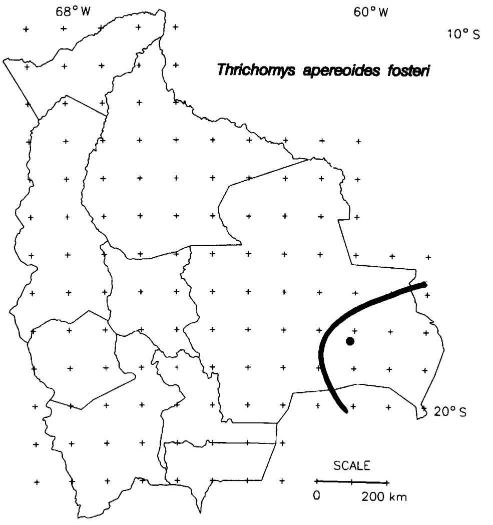


Fig. 782. Locality of known occurrence of *Thrichomys apereoides fosteri.*

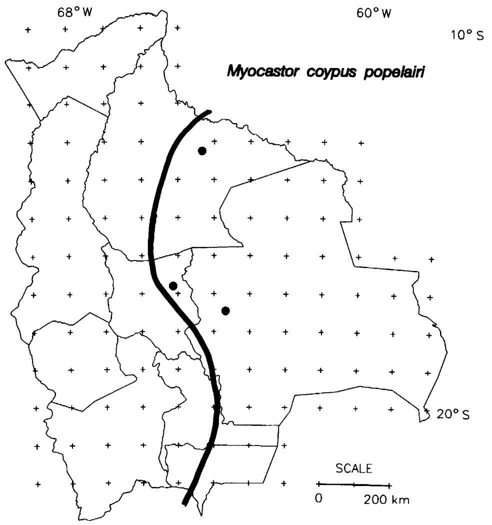


Fig. 783. Localities of known occurrence of *Myocastor coypus popelairi.*

outside of Bolivia. *Echimys apereoides* was described by Lund (1839: 38), type locality Lagoa Santa, Minas Gerais, Brazil. *Tricomys fosteri* was described by Thomas (1903a: 227), type locality "Sapucay, Paraguay."

Morphological Characters and Comparisons: Measurements in tables 18 and 21 are of specimens from 1816/6007 (AM 260860) or Paraguay (AM 248463).

Distributional Notes: The only known Bolivian locality is noted below and mapped in figure 782.

Habitat: Relatively flat and arid area at the northern edge of the Chaco, with scattered shrubs and no large rocks.

No detailed Bolivian data are available on habits, behavior, or food.

Reproduction: The only Bolivian specimen was taken in October and was a young individual (50 g).

Scientific synonyms relating to Bolivian specimens are:

Thrichomys apereoides fosteri
(Thomas), 1903

Cercomys cunicularius: Anderson, 1985b: 14 (name only).

Thrichomys apereoides: Olds, et al., 1987: 17. Glanz and Anderson, 1990: 32. Anderson, 1993: 41 (1816/6007).

Specimen, 1. **Santa Cruz:** 1816/6007, 7 km N and 38 km W of Roboré, 1 AM.

FAMILY MYOCASTORIDAE AMEGHINO, 1904

Genus *Myocastor* Kerr, 1792

Myocastor coypus (Molina, 1782)

Nutria,Coypu

Taxonomic Remarks: One name used for Bolivian specimens has its type locality outside of Bolivia. *Mus Coypus* was described by Molina (1782: 287), type locality Río Maipo, Santiago Province, Chile. In their summary of the biology and nomenclature of the species, Woods et al. (1992) stated that "the species contains four subspecies" (*Myocastor coypus popelairi* not being included) and cited Willner (1982) as their authority; however, Willner cited five subspecies, the fifth being *Myocastor coypus popelairi.*

Morphological Characters and Comparisons: Measurements in tables 18 and 21 are of specimens from Buenavista (FM 25257, 25258).

Distributional Notes: Widely distributed in streams of subtropical and temperate lowlands, but few localities represented by specimens and populations probably much reduced by trapping for fur. Known localities are listed below and mapped in figure 783.

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

CONSERVATION STATUS: Not listed under CITES as endangered or threatened. Not common at present in Bolivia.

Scientific synonyms used for Bolivian specimens are:

Myocastor coypus popelairi (Wesmael, 1841)

Mastonotus Popelairi Wesmael, 1841: 61 (type locality Bobica, Bolivia).

Myocastor coypus: Boule and Thevenin, 1920: 225 and pl. XXV, fig. 7 (Pleistocene fossil from Tarija).

Myocastor coypus popelairi: Osgood, 1943: 132 (first use of name combination). Cabrera, 1961a: 570 (Bobica). Anderson, 1985b: 14 (name in list). Anderson, 1993: 43 (general distributional records). Anderson et al., 1993: 48 (vicinity of Santa Cruz de la Sierra).

Myocasto coypus: Arce Pereira et al., 1963: 150 (name in list; río Chapare).

LOCALITIES (4) AND SPECIMENS (5): **Beni:** 1315/6420, Piedras Blancas, 1 MNK. **Cochabamba:** 1648/6508, Todos Santos, 1 AM. **Santa Cruz:** 1727/6340, Buenavista, 2 FM. **Department unknown:** coordinates uncertain, Bobica, type locality.

ORDER LAGOMORPHA BRANDT, 1855

FAMILY LEPORIDAE FISCHER, 1817

Genus *Lepus* Linnaeus, 1758

Lepus europaeus Pallas, 1778

Hare [more specifically, European Hare], Liebre

TAXONOMIC REMARKS: *Lepus europaeus* was described by Pallas (1778: 30), type locality Burgundy, France. *Lepus capensis* was described by Linnaeus (1758: 57), type locality Cape of Good Hope, South Africa. These were considered to be conspecific, but are now regarded as distinct species (Hoffmann *in* Wilson and Reeder, 1993: 817).

MORPHOLOGICAL CHARACTERS AND COMPARISONS: The introduced species of lagomorphs, *Lepus europaeus* and *Oryctolagus cuniculus*, are larger than the native species, *Sylvilagus brasiliensis*. Measurements of the young specimen (AM 262662) from near Iscayachi, of a young adult (AM 205734) from Uruguay, and of an older adult (AM 41488) from the province of Mendoza in Argentina are as follows: total length, 374, 532, – mm; length of tail, 42, 65, –; length of hind foot, 98, 151, –; length of ear from notch, 57, 100, –; weight, 650, –, – g; BR (abbreviations explained in the following account for *Oryctolagus*) 45.7, 71.7, 79.8; IF 13.6, 22.0, 24.9; PA 5.5, 7.2, 7.1; MA 11.7, 16.0, 18.1; MF 6.1, 9.3, 11.5; BO 6.2, 8.3, 8.4; IO 13.6, 18.1, 19.9; PO 12.7, 12.7, 14.7; ZY 34.4, 43.5, 47.5; BC 27.5, 30.6, 32.9; and BW 28.5, 35.1, 36.3.

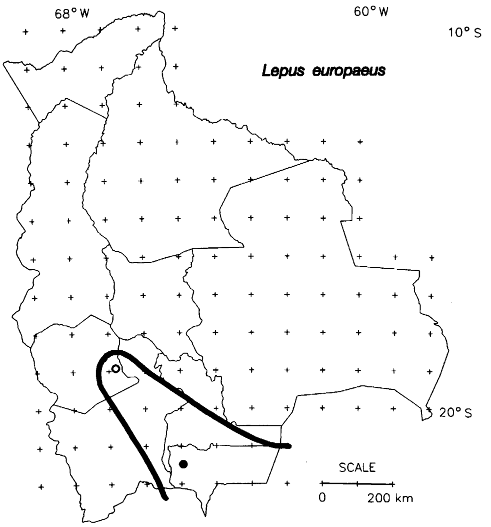


Fig. 784. Localities of known occurrence of *Lepus europaeus*.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 784. The species was reported to have entered Bolivia from Argentina in 1958 and to have spread widely in southern Tarija by 1960 (Dr. Mario Borda Pisterna in Grigera and Rapaport, 1983). A well-established local population was present southeast of the city of Oruro by 1991 (correspondence and color photographs on file at the American Museum of Natural History, obtained from James Scanlon of San Rafael, California).

No detailed Bolivian data are available on habitat, habits, behavior, food, or reproduction.

Scientific synonyms used for Bolivian specimens are:

Lepus capensis: Grigera and Rapoport, 1983: 163–166 (sight records for southern Tarija). Parker et al., 1993: 103 (reported by local people at Curuyuqui and Perforacion in Santa Cruz).

Lepus capensis europaeus: Anderson, 1993: 49 (general distributional records).

Specimens, 1. **Tarija:** 2129/6457, 1 km E of Iscayachi, río Tomayapo, 1 AM.

Genus *Oryctolagus* Lilljeborg, 1873

Oryctolagus cuniculus (Linnaeus), 1758

Vernacular names of this introduced species are Rabbit [or more specifically European Rabbit], Conejo, and Belgian Hare.

TAXONOMIC REMARKS: *Lepus Cuniculus* was described by Linnaeus (1758: 58); type locality "Europa *australi*" restricted by Miller (1912a: 490) to Germany. Lilljeborg (1874: 417) first used the name combination *Oryctolagus cuniculus*. Subspecies names have been applied in Europe to native populations of rabbits but subspecies names are not applicable to domestic breeds.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: As noted in the key, a narrow mesopterygoid fossa, in contrast to the wide fossa of *Lepus europaeus*, is one of the most distinctive features in *Oryctolagus cuniculus*. Measurements of two specimens from England (AM 34816 for cranial data and 36106 for external data) are as follows: total length, 410 mm; length of tail, 62; length of hind foot, 90; length of ear from notch, 68; basilar length (BR), 59.1; length of incisive foramen (IF), 19.3; palatal length (PA), 5.0; alveolar length of maxillary tooth row (MA), 13.2; width of mesopterygoid fossa (MF), 5.6; basioccipital constriction (BO), 6.9; interorbital breadth (IO), 11.4; postorbital breadth (PO), 11.3; zygomatic breadth (ZY), 37.1; breadth of braincase (BC), 27.9; and breadth across bullae (BW), 30.8. Some domestic breeds of the European rabbit are much larger than the wild population represented by the measurements above.

DISTRIBUTIONAL NOTES: There are no well-documented specimens of Bolivian *Oryctolagus*, but domestic rabbits of various breeds are kept there, and it is possible that they will be found in the feral state from time to time. Photos of crania (locality of origin uncertain, but presumably Bolivian) in Cuenca (1990, pl. 5) were misidentified as *Ctenomys* or *Scapteromys*.

The only scientific name used for Bolivian specimens is:

Oryctolagus cuniculus: Mercado and Miralles, 1991: 295 (La Paz Valley).

Genus *Sylvilagus* Gray, 1867

Sylvilagus brasiliensis (Linnaeus), 1758

Rabbit, Conejo, Tapeti

TAXONOMIC REMARKS: Some names used for Bolivian specimens have type localities outside of Bolivia. *Lepus brasiliensis* was described by Linnaeus (1758: 58), type locality "America meridionali" restricted by Thomas (1911c: 146) to Pernambuco, Brazil. *Sylvilagus brasiliensis gibsoni* was described by Thomas (1918: 192), type locality "Manuel Elordi, Vermojo, Salta, 500 m," (= alto Bermejo, province of Salta, Argentina). *Sylvilagus brasiliensis inca* was described by Thomas (1913b: 210), type locality "Cadena," province of Quispicanchi, district of Marcapata, Cuzco, Peru, elevation 890 m. Bolivian specimens are assigned to the subspecies *S. b. inca* on geographic grounds and only to call attention to the need for more specimens and for critical comparisons when specimens are available. The other two subspecies in Bolivia also need critical review. Pilleri (1977b: 48) listed *Sylvilagus minensis* for Bolivia, but *minensis* has been restricted otherwise to eastern Brazil.

MORPHOLOGICAL CHARACTERS AND COMPARISONS: See notes at the end of subspecies accounts.

DISTRIBUTIONAL NOTES: Known localities are listed below and mapped in figure 785.

No detailed Bolivian data are available on habitat, habits, behavior, or food.

PARASITOLOGY: Fonseca (1960: 93) reported ixodid ticks (*Hemaphysalis leporispalustris*) from Buen Retiro (1717/6338) and Boyuiba (2025/6317). *Polygenis* (*Gephyropsylla*) *klagesi samuelis*, a flea, was reported from Buen Retiro (Smit, 1987: 250).

REPRODUCTION: Three females, taken in February, May, and September, each had two

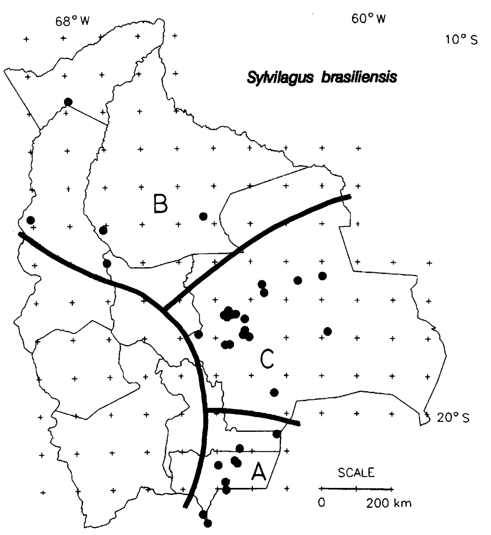


Fig. 785. Localities of known occurrence of three subspecies of *Sylvilagus brasiliensis*, *S. b. gibsoni* (A), *S. b. inca* (B), and *S. b. paraguensis* (C).

embryos. Young were recorded by collectors in May, August, and September.

Scientific synonyms used for Bolivian specimens are given in the subspecies accounts below:

Sylvilagus brasiliensis gibsoni

Thomas, 1918

Sylvilagus brasiliensis gibsoni Thomas, 1925: 581 (Caraparí). Hershkovitz, 1950: 375 (Caraparí, Villa Montes, Yacuiba). Anderson, 1993: 35 (general distributional records).

Sylvilagus paraguensis: Eisentraut, 1933: 56 (observations near Villa Montes in Tarija). Eisentraut, 1983: 108 (name in list).

Sylvilagus (*Tapeti*) *brasiliensis paraguensis*: Krumbiegel, 1942a: 25 (Villa Montes).

Sylvilagus brasiliensis paraguayensis: Fonseca, 1960: 93 (ectoparasites, Boyuiba (2025/6317, in Santa Cruz).

Localities (10) and Specimens (15): **Chuquisaca:** 2033/6217, Bolivian border near Sargento Rodriguez, Paraguay, 1 UCONN (R. M. Wetzel personal commun.); 2056/6321, 2 km S and 10 km E of Tiquipa, Laguna Palmar, 1 AM. **Tarija:** 2115/6330, Villa Montes, 1 ANSP, 1 ZSM (Krumbiegel, 1942a); 2119/6325, 8 km S and 10 km E of Villa Montes, 1 AM; 2122/6358, 18 km W of Palos Blancos, 1 AM (tuft of hair only); 2149/6346, Caraparí, 2 BM; coordinates uncertain, 10 mi [= 16 km] S of Capaparí, 1 FM; 2202/6345, Yacuiba, 1 FM, 2 MACN (not examined); 2241/6426, río Lipeo, 2 ANSP; 2255/6418, Fortín Campero, 1 ANSP.

Measurements of specimens from the following localities have the ranges of values given: Caraparí (BM 25.2.1.70 and 71), río Lipeo (ANSP 18205–18206), Fortín Campero (ANSP 18207), Yacuiba (FM 21427), and 10 mi S of Capaparí (FM 23789); total length, 327–380 mm; length of tail, 19–30; length of hind foot, 71–82; length of ear from notch, 53–72; BR (abbreviations explained in the account for *Oryctolagus cuniculus*), 49.6–52.6; IF 15.9–17.2; PA 5.2–6.5; MA 12.6–14.1; MF 6.9–7.7; BO 6.0–7.7; IO 15.0–17.3; PO 12.6–14.8; ZY 31.5–33.5; BC 23.9—25.3; and BW 25.7–28.3.

Sylvilagus brasiliensis inca

Thomas, 1913

Sylvilagus brasiliensis inca: Anderson, 1993: 35 (general distributional records).

Sylvialagus brasiliensis: Arce Pereira et al., 1963 (name in list; Todos Santos).

Sylvilagus brasiliensis capsalis: Anderson, 1985b: 11 (misused this subspecies name in a list).

Sylvilagus brasiliensis: Cabot et al., 1986: 43 (undocumented name in list). Tello, 1986: 20 (Toitetu, reports from elsewhere). Cameron et al, 1989: 69 (observations in western Pando). Ergueta and Salazar Bravo, 1991: 36 (general summary). Emmons, 1991: 72 (seen at Alto río Madidi in La Paz department).

Localities (5) and Specimens (5): **Beni:** 1448/6418, Ibiato, reserva Siriono, 1 CBF; 1508/6705, 4 km N of Yacuma, 1 MSB. **Cochabamba:** 1600/6700, Misiones Mosetenes, 1 BM. **La Paz:** 1448/6904, Pelechuco, 1 AM. **Pando:** 1142/6756, Palmira, 1 AM.

Measurements of a specimen from Palmira (AM 262661, external and cranial data) and one from Misiones Mosetenes (BM unregistered, cranial data only) are as follows: total length, 370 mm, length of tail, 15; length of hind foot,78; length of ear from notch, 58; weight, 1250 g; BR (abbreviations explained in the preceding account for *Oryctolagus cuniculus*) 52.1, 53.6; IF 17.8, 18.7; PA 5.9, 5.3; MA 14.2, 13.8; MF 6.9, 6.8; BO 7.6, 7.2; IO 15.8, 16.2; PO 14.2, 13.5; ZY 34.1, 34.1; BC 24.3, 25.3; and BW 28.9, 27.0.

Sylvilagus brasiliensis paraguensis Thomas, 1901

Lepus brasiliensis: Waterhouse, 1848: 141 ("Bolivia"). Gerrard, 1862: 202 (one from Bridges's coll., Bolivia only).

Sylvilagus paraguensis Thomas, 1901i: 539 (type locality Sapucay, east of Asunción, Paraguay).

Sylvilagus brasiliensis paraguensis: Thomas, 1913b: 210 (first use of name combination). Hershkovitz, 1950: 371 (Buenavista, San Carlos). Vieira, 1955: 406 ("Bolivia"). Anderson, 1993: 35 (general distributional records). Anderson et al., 1993: 41 (vicinity of Santa Cruz de la Sierra).

Sylvilagus brasiliensis paraguayensis: Fonseca, 1960: 93 (ectoparasites, Buen Retiro).

Sylvilagus brasiliensis: Krumbiegel, 1942a: 25 (discussed the subspecies but was not explicit in assigning ranges to them). Tello, 1986: 20 (Zapoco). Smit, 1987: 250 (fleas from Buen Retiro). Ergueta and Salazar Bravo, 1991: 36 (general summary).

Silvilagus brasiliensis: Parker et al., 1993: 103 (reported by local people at Perforación).

LOCALITIES (20) AND SPECIMENS (66): **Santa Cruz:** 1623/6059, San Ignacio, province of Velasco, 1 US; 1630/6140, Zapoco, 3 MNK; 1636/6241, La Laguna, 1 EBD; 1649/6237, Palmarito, río San Julián, 1 BM; 1717/6338, Buen Retiro, 2 MACN (not examined); 1722/6325, Sara Province, 1 BM; 1722/6341, río Dolores, 1 MACN (not examined); 1723/6332, San Miguel Rincón, 2 AM, 1 MSB; 1724/6345, San Carlos, 1 FM, 1 MACN (not examined); 1727/6340, Buenavista, 1 AM, 1 ANSP, 11 BM, 4 FM, 6 UMMZ, 1 ZSM (Krumbiegel, 1942a), 10 MACN (not examined); 1730/6310, Warnes, 1 US; 1748/6310, Santa Cruz de la Sierra, 3 CM; 1750/6050, San José Chiquitos, 3 ZSM (Krumbiegel, 1942a); 1754/6429, Comarapa, 1 BM; 1755/6313, 12 km S of Santa Cruz, 1 AM; 1758/6303, 27 km SE of Santa Cruz, 1 Hayward coll.; 1810/6336, Vermejo, 1 AM; 1811/6344, 1 km NE Estancia Cuevas, 1 MSB; 1927/6221, Cerro Colorado, 4 EBD; coordinates uncertain, N. Moka, 1 MACN (not seen).

External measurements of a specimen from San Miguel Rincón (AM 260343) are total length, 350 mm; length of tail, 20; length of hind foot, 75; length of ear from notch, 52; weight, 800 g. Ranges for cranial measurements in a sample from Buenavista (ANSP 14293, UM 55914, 55916, 56584, BM 26.1.5.21, 26.1.12.12, 26.12.4.66 and 67) are BR (abbreviations explained in the account for *Oryctolagus cuniculus*) 50.6–57.4; IF 16.6–18.4; PA 5.3–6.2; MA 12.9–15.0; MF 5.8–7.6; BO 6.6–8.3; IO 15.5–18.1; PO 11.9–14.1; ZY 31.7–35.6; BC 23.1–26.2; and BW 26.5–29.9.

Sylvilagus brasiliensis, subspecies not determined

Coordinates uncertain, "Bolivia" only, 2 BM, 3 MNLP.

SPECIES HYPOTHESIZED TO OCCUR

When I began work in Bolivia in 1963, a sizable separate list of "species of postulated occurrence" was prepared by our group. In subsequent years, Bolivian specimens of most of these species were obtained, and several species new to science have been discovered and described. Other species, not in either the original main list or the postulated list, have also been obtained. Others will enter the country, or are already there and merely awaiting discovery. The present list of more than 70 species of hypothetical or potential Bolivian occurrence may be useful in the task of discovery.

Orders and families are arranged in a traditional order (e.g., as in Wilson and Reeder, 1993, with marsupials as the most "primitive" group first); then genera and species are arranged alphabetically within each order, or family.

A number of species of native mammals not yet known from Bolivia were mapped as occurring within 200 km of the southern Bolivian border in Chile, Argentina, or Paraguay (by Redford and Eisenberg, 1992, with dots showing precise localities but with no lists of specimens or collections to document the basis for the dots). Species located this close to Bolivia are listed here, along with comments on ecological considerations that may suggest a low probability of their occurrence in Bolivia. A few names of taxa reported to occur (or possibly to occur) in Bolivia are included in this list, although the taxa are not now thought to occur there. Useful data on other species that may eventually be discovered to occur in Bolivia are in a recently published faunal list (Pacheco et al., 1993) for the Manu Biosphere Reserve some 150 to 200 km W of the Bolivian border in the drainage basin of the río Madre de Dios and its left tributary the río Manu, at elevations from 365 to 3450 m. Other references in the literature provide bases for postulating other species now known in Peru or Brazil that may eventually be found in Bolivia as well. Some of the species listed here are included in the keys, but most are not.

ORDER MARSUPIALIA

FAMILY DIDELPHIDAE

Caluromysiops irrupta. Reported from the Manu Reserve in Peru, from 380 to 450 m elevation (Pacheco et al., 1993: 5).

Gracilinanus kalinowskii. Described by Hershkovitz (1992b: 37); type locality "Hacienda Cadena, Marcapata, 13°20′S, 70°46′W, Cuzco, Peru, 8890 m."

Marmosa andersoni. Reported from the Manu Reserve in Peru, at 600 m elevation (Pacheco et al., 1993: 5).

Marmosa rubra. Reported from the Manu Reserve in Peru, at 600 m elevation (Pacheco et al., 1993: 5).

Monodelphis dimidiata: Redford and Eisenberg (1992: 34) mapped this species in Salta province, Argentina, just south of Bolivia, on the basis of the report by Ojeda and Mares (1989: 24) of a specimen from Tartagal. This specimen had been reported earlier as *M. fosteri* by Crespo (1964).

Monodelphis touan: Redford and Eisenberg (1992: 37) mapped this species in the Chaco of Paraguay near the Bolivian border; basis for the report not known to me. Earlier, Eisenberg (1989: 43) had treated *touan* as "probably a junior synonym of *M. brevicaudata.*" Gardner (*in* Wilson and Reeder, 1993: 21) also listed it as a junior synonym.

ORDER XENARTHRA

Cabassous chacoensis: This species was described from the Gran Chaco in Paraguay and its range may reach into Bolivia, but no Bolivian specimen has been obtained yet.

Dasypus hybridus: A specimen in the Instituto Miguel Lillo, Tucumán, from Abra de Canas, Jujuy, was cited by Heinonen and Bosso (1994: 55). Roig (1991: 252) mapped the range of *D. hybridus* into southeastern Bolivia, with no further documentation.

ORDER CHIROPTERA

FAMILY EMBALLONURIDAE

Saccopteryx canescens: Occurs in Peru (Pacheco et al., 1995: 8).

Peropteryx leucoptera: Occurs in Peru (Woodman et al., 1991: 6; Pacheco et al., 1995: 8).

Cormura brevirostris: The type locality of *Emballonura brevirostris* Wagner, 1843, is "Baraneiva" (= Bananeira, Mato Grosso, Brazil) on the Bolivian border, according to Carter and Dolan (1978: 18). Recorded in Amazonas (Rio Juruá; Itacoatiara; Vieira, 1955: 355), Brazil, to the north of Bolivia. Also known from southeastern Peru (Koopman, 1978: 2).

Diclidurus albus: Recorded from Porto Velho, Brazil, by Vieira (1955: 357).

FAMILY PHYLLOSTOMIDAE

Anoura, species not yet described: Reported from the Manu Reserve in Peru, at elevation 350 m (Pacheco et al., 1993: 6).

Glossophaga commissarisi: Reported from the Manu Reserve in Peru, at elevation 350 m (Pacheco et al., 1993: 6).

Artibeus (*Koopmania*) *concolor*: Reported from Balta, Loreto department, in Peru (Gardner, 1976: 10).

Lionycteris spurrelli: Recorded from southeastern Peru (Tuttle, 1970: 68) and from the Manu Reserve, at 820 to 1100 m elevation (Pacheco et al., 1993: 6).

Micronycteris (*Glyphonycteris*) *behni*: Recorded from southeastern Peru and from Matto Grosso in Brazil by Sanborn (1949a: 231). Another species of this subgenus that is known from southeastern Peru (AMNH 214316) several hundred km west of Bolivia is *M. sylvestris*. In view of the fact that extensions of known range of more than 500 km are still frequently discovered, other species of bats not placed in this hypothetical list may remain to be discovered within Bolivia.

Micronycteris (*Micronycteris*) *schmidtorum*: Reported from the Centro de Investigación Jenaro Herrera, Requena, Loreto, Peru, by Ascorra et al. (1991a: 351). "*Micronycteris* cf. *schmidtorum*" was reported from the Manu Reserve in Peru, at 490 to 680 m elevation (Pacheco et al., 1993: 5), but there is some question about the identification in this case.

Micronycteris (*Lampronycteris*) *brachyotis*: Occurs in Peru (Pacheco et al., 1995: 8).

Micronycteris (*Xenoctenes*) *hirsuta*: Recorded from Peru and Amazonian Brazil.

Sturnira bidens: Occurs in Peru (Pacheco et al., 1995: 10).

Vampyressa melissa: Reported from the Manu Reserve in Peru, at 1180 to 1700 m elevation (Pacheco et al., 1993: 7).

Vampyressa nymphaea: Reported from the Manu Reserve in Peru, at 350 m elevation (Pacheco et al., 1993: 7).

FAMILY NATALIDAE

Natalus stramineus: Reported from Aripuaña, Mato Grosso, in Brazil, about 275 km from the Bolivian border, by Mok et al. (1982: 821).

FAMILY FURIPTERIDAE

Amorphochilus schnablii: This species is known from the arid lowlands of northern Chile within 200 km of the Bolivian border (Mann, 1950: 5), but probably does not occur at the high elevations along the border.

Furipterus horrens: Reported from the Manu Reserve in Peru, at 350 to 900 m elevation (Pacheco et al., 1993: 7).

FAMILY THYROPTERIDAE

Thyroptera lavali: Recently described from Loreto department (0420/7155), Peru, by Pine (1993: 213). This is nearly 800 km N of Bolivia, but extensions of this magnitude in the known ranges of bat species are not uncommon.

FAMILY VESPERTILIONIDAE

Eptesicus brasiliensis: Occurs north of Bolivia and has been reported for Argentina (Barquez et al., 1993: 56). Bolivian specimens previously reported as *E. brasiliensis* are now assigned to *E. andinus* a separate species.

Eptesicus diminutus: Occurs in northern Argentina; mapped up to the Bolivian border in Salta province by Mares et al. (1989: 77). A specimen (MACN) from Aguaray, Salta, was reported by Barquez and Ojeda (1992: 247). Two specimens were reported by Barquez and Lougheed (1990: 262) as *Eptesicus diminutus fidelis* from Laguna La Brea in Jujuy province. A specimen from Juan de Zalazar (2306/5918), Paraguay, was reported as *Eptesicus* cf. *fidelis* by Wetzel and Lovett (1974: 207).

Histiotis macrotus: *H. laephotis* has been referred to *H. macrotus* as a subspecies (Koopman, 1993: 205, *in* Wilson and Reeder). *Histiotis macrotus* was mapped in Argentina by Redford and Eisenberg (1992: 103) and Mares et al. (1989: 81) up to the Bolivian border, thus implying that it probably occurs in Bolivia. Barquez and Lougheed (1990: 262) reported two specimens from 8 km SE of Tres Cruces in Jujuy province at elevation 3600 m. Until this genus has been revised, some uncertainty remain about what names are applicable to which specimens.

Myotis atacamensis: This species occurs in the Atacama Desert of Chile within 200 km of the Bolivian border (La Val, 1973: 19) at lower elevations along the Pacific Coast but probably does not occur at the high elevations along the Bolivian border.

FAMILY MOLOSSIDAE

Eumops dabbenei: This species was originally described from the Chaco province in Argentina. Eger (1977: 36) reported it also from northern Venezuela and Colombia, but there are no records from between Argentina and this northern area. A Bolivian specimen of *Eumops perotis* was reported as possibly representing *E. dabbenei* (Anderson, 1993: 26), but it is not of that species.

Molossops neglectus: Described in 1980 from Surinam and reported more recently from Peru, Brazil, and Argentina (Ascorra et al., 1991b; Barquez et al., 1993). Evidently widespread but uncommon.

Mormopterus kalinowskii: Mapped by Redford and Eisenberg (1992: 123) at lower elevations along the Pacific Coast but not likely to occur in Bolivia.

Neoplatymops mattogrossensis: This species occurs, as the name implies, in the Brazilian Matto Grosso just east of Bolivia (Peterson, 1965: 6) and may be expected in eastern Santa Cruz.

ORDER PRIMATES

Lagothrix lagotricha: Reported by Fooden (1963: 219) from the río Tambopata below San Ignacio (about 3000 ft), Puno, Peru, just west of the Bolivian border, and mapped as probably occurring in northern Bolivia.

ORDER CARNIVORA

FAMILY CANIDAE

Dusicyon griseus: This species of gray fox was mapped by Redford and Eisenberg (1992: 149) and by Mares et al. (1989: 229) in Salta, Argentina, just south of Bolivia. In the classification used here, the name *Pseudalopex griseus* would apply.

Dusicyon vetulus: Reported to have been seen at Chapada dos Guimares in Mato Grosso, Brazil (Ginsberg and Macdonald, 1990: 31). This is near Cuiabá, some 200 km E of Bolivia and at 1526/5545. It is thus a possibility for the Huanchaca area. In the classification used here, the name *Pseudalopex vetulus*, or perhaps *P. vetula*, would apply. I have not ascertained the source of the epithet *vetulus*. Some authors have placed *vetulus* in a genus (or subgenus) *Lycalopex*.

FAMILY FELIDAE

Felis tigrina: Mapped by Redford and Eisenberg (1992: 168) and by Mares et al. (1989: 256) in Salta, Argentina, just south of Bolivia. The known geographic range and habitat suggest a high probability that this species will be found in Bolivia. Regarded as endangered under CITES (Appendix I). Vernacular names are Little Spotted Cat, Gato Tigre, and Chivi. Measurements in tables 12 and 13 are of specimens from the Tambopata Valley, San Juan, Peru (FM 78404, 79923).

FAMILY PROCYONIDAE

Bassaricyon gabbii: Reported from the Manu Reserve in Peru, at elevation 380 m (Pacheco et al., 1993: 8). May be conspecific with *B. alleni* that is known from Bolivia.

ORDER RODENTIA

FAMILY SCIURIDAE

Microsciurus flaviventer: Reported from the Manu Reserve in Peru, at 400 to 1000 m elevation (Pacheco et al., 1993: 8). Observations of "*Microsciurus* sp." were reported by Emmons and Smith (1992) at Ingavi (1057/6650).

Sciurus igniventris: Reported from the Manu Reserve in Peru, at 600 to 850 m elevation (Pacheco et al., 1993: 8).

Sciurus sanborni: Reported from the Manu Reserve in Peru, at 365 to 400 m elevation (Pacheco et al., 1993: 8).

FAMILY MURIDAE

Akodon azarae: Mapped by Redford and Eisenberg (1992: 299) in northern Argentina and Paraguay; see discussion elsewhere in text.

Akodon budini: Mapped by Redford and Eisenberg (1992: 300) at high elevations in northwestern Argentina. Reported from three localities in or near the Parque Nacional Calilegua in Jujuy by Heinonen and Bosso (1994: 55).

Akodon caenosus: Mapped by Redford and Eisenberg (1992: 301) in northern Argentina; here regarded as a subspecies of *A. lutescens*.

Akodon cursor: Mapped by Redford and Eisenberg (1992: 302) in northern Paraguay.

Akodon illuteus: Mapped by Redford and Eisenberg (1992: 304) in northwestern Argentina. Reported from Duraznillar in Jujuy by Heinonen and Bosso (1994: 55).

Akodon olivaceus: Mapped by Redford and Eisenberg (1992: 311) along the Pacific Coast.

Akodon torques: Reported from the Manu Reserve in Peru, at 2100 to 3450 m elevation (Pacheco et al., 1993: 8). See also Smith and Patton (1993: 168) for map of Peruvian range.

Calomys sorellus: Occurs in Peru north of Lake Titicaca and within 100 km of the Bolivian border at Hacienda Calacala (1502/6956, MVZ 114674, 116671–116675; Olds, 1988).

Holochilus brasiliensis: Mapped by Redford and Eisenberg (1992: 328) in northern Argentina and Paraguay; these populations are now considered to be of a different species, *H. sciureus*.

Holochilus chacarius: Mapped by Redford and Eisenberg (1992: 329) in northern Paraguay. See Musser and Carleton (*in* Wilson and Reeder, 1993: 704) for summary and references.

Neacomys tenuipes: Reported from Cuzco Amazonico near the Bolivian border by Woodman et al. (1991: 9; 1995: 9).

Neacomys, species not yet described: Reported from the Manu Reserve in Peru, at elevation 1500 m (Pacheco et al., 1993: 9).

Neusticomys peruviensis: Reported from the Manu Reserve in Peru, at elevation 350 m (Pacheco et al., 1993: 9).

Oecomys phaeotis: Reported from the Manu Reserve in Peru, at 600 to 1700 m elevation (Pacheco et al., 1993: 9).

Oecomys superans: Reported from the Manu Reserve in Peru, at 350 to 500 m elevation (Pacheco et al., 1993: 9).

Oecomys tapajinus: Reported from Cuzco Amazonico in Peru near the Bolivian border by Woodman et al. (1991: 9; 1995: 7).

Oligoryzomys longicaudatus: As now known, was mapped by Redford and Eisenberg (1992: 268) in northern Argentina as *Oryzomys longicaudatus*. Critical revision is needed. Bolivian specimens once assigned to *O. longicaudatus* have been reassigned to one of three species, none of which is thought to be conspecific with the now restricted *O. longicaudatus*.

Oligoryzomys nigripes: Mapped by Redford and Eisenberg (1992: 270) as *Oryzomys nigripes*; reported by Myers and Carleton (1981: 15) as occurring east of the Paraguay River. Prior to their revision, the species was thought to have a larger range.

Oryzomys fornesi: Mapped by Redford and Eisenberg (1992: 267) in northern Paraguay; regarded by Olds and Anderson (1987: 271) as conspecific with *Oligoryzomys microtis*, a species with a wide distribution in Bolivia.

Oryzomys keaysi: Reported from the Manu Reserve in Peru, at 1180 to 2250 m elevation (Pacheco et al., 1993: 9). Bolivian material formerly identified as *O. keaysi* is now thought to be *O. levipes*.

Oryzomys ratticeps: Mapped by Redford and Eisenberg (1992: 271) in northern Paraguay.

Oxymycterus akodontius: Mapped by Redford and Eisenberg (1992: 320) in northwestern Argentina; perhaps conspecific with *O. paramensis* (Hershkovitz, 1994: 26) but needs further critical review.

Phyllotis osgoodi: Mapped by Redford and Eisenberg (1992: 294) in extreme northern Chile. Recognized as a species and said to occur in the "Altiplano of NE Chile" by Musser and Carleton (*in* Wilson and Reeder, 1993: 738). Earlier it was treated as a synonym of *Phyllotis darwini chilensis* (Pearson, 1958: 415; Pine et al., 1979: 353). Hershkovitz (1962: 318) regarded both *osgoodi* and *chilensis* as synonyms of *P. darwini rupestris*. Chilean authors have recognized *P. osgoodi* (Walker et al., 1979: 210; Spotorno and Walker, 1979: 83; 1983: 53).

Scapteromys tumidus: Mapped by Redford and Eisenberg (1992: 333) in northern Paraguay. The species might occur in the wet marshes of the pantanal along the eastern Bolivian border. Photos of specimens labeled as *Scapteromys* by Cuenca (1990) are misidentified. The skull in plate 5, for example, is of an *Oryctolagus*. There are other misidentifications also, so this little manual for rodent identification should be used with caution.

Thomasomys gracilis: Reported from the Manu Reserve in Peru, at elevation 3400 m (Pacheco et al., 1993: 9).

Thomasomys notatus: Reported from the Manu Reserve in Peru, at elevation 1500 m (Pacheco et al., 1993: 9).

FAMILY CHINCHILLIDAE

Chinchilla brevicaudata: Redford and Eisenberg (1992: 348) mapped populations of the genus in northwestern Argentina and northern Chile under this name, and *Chinchilla lanigera* was considered to be a separate species that occurs only in central Chile farther south. I follow Allen (1942: 389) in regarding these as conspecific.

Lagidium wolffsohni: This species is listed here because of the possibility of confusion engendered by the legends for two maps (11.110 and 11.111 in Redford and Eisenberg, 1992: 352) that were switched by mistake. Thus, this species seems to have been mapped in central and northern Argentina and in the Chaco of Paraguay near the Bolivian border. However, the distribution was given correctly in text as southwestern Argentina and adjacent Chile, and hence nowhere near Bolivia.

FAMILY CAVIIDAE

Cavia aperea: Redford and Eisenberg (1992: 333) mapped one locality in northern Paraguay. The name *C. tschudii* was used for highland populations in northwestern Argentina.

Microcavia australis: Mapped by Mares et al. (1989: 192) in the lowlands of Salta province in northern Argentina.

Microcavia shiptoni: Mapped by Mares et al. (1989: 195) in the highlands of northern Argentina.

FAMILY DASYPROCTIDAE

Myoprocta pratti: Observations in Pando at 0950/6540, Gentry camp on río Negro and 1057/6650, Ingavi (Emmons and Smith, 1992). Reported localities are mapped in figure 767. Woods (*in* Wilson and Reeder, 1993: 782) included *pratti* in the synonymy of *M. acouchy*, but noted that the "group needs to be revised."

FAMILY AGOUTIDAE

Agouti taczanowskii: Reported from the Manu Reserve in Peru, at elevation 3350 m (Pacheco et al., 1993: 9).

FAMILY OCTODONTIDAE

SUBFAMILY CTENOMYINAE

Ctenomys dorsalis: Mapped by Redford and Eisenberg (1992: 368) in northern Paraguay.

Ctenomys fulvus: Mapped by Redford and Eisenberg (1992: 370) in northern Chile near the Bolivian border.

Ctenomys mendocinus: Mapped by Mares et al. (1989: 215) in the highlands of northern Argentina.

Ctenomys peruanus: Occurs in Peru, at Pisacoma, less than 10 km from the Bolivian border (Sanborn and Pearson, 1947).

FAMILY ECHIMYIDAE

Dactylomys dactylinus: Reported from the Manu Reserve in Peru, at 350 to 815 m elevation (Pacheco et al., 1993: 9).

Echimys macrurus: Known from Amazonian Brazil.

Echimys cf. *occasius*: Reported from the Manu Reserve in Peru, at elevation 380 m (Pacheco et al., 1993: 9). Treated as a separate species by Emmons and Feer (1990: 218). Treated as a synonym of *Makalata armata* by Woods (*in* Wilson and Reeder, 1993: 793), which is *Echimys didelphoides* in the present account.

Proechimys, species not yet described: Reported from the Manu Reserve in Peru, at elevation 350 m (Pacheco et al., 1993: 9).

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TABLE 1

Numbers of Bolivian Species of Mammals with Geographic Ranges Grouped as Discussed in Text

	Unclassified	Amazonian	Chaco	Altiplano	Yungas
Marsupialia	7	10	1	1	4
Xenarthra	4	6	5	1	0
Chiroptera	12	70	1	1	8
Primates	2	14	0	0	0
Perissodactyla	1	0	0	0	0
Artiodactyla	7	0	1	3	2
Carnivora	12	9	0	2	3
Odontoceti	0	1	0	0	0
Rodentia	24	26	8	22	27
Lagomorpha	1	0	0	0	0

TABLE 2

External Measurements (in mm) of the Marsupialia

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)
		Family Didelphidae Subfamily Caluromyinae			
Caluromys lanatus lanatus					
FM 114649, F	602	401	37	35	—
BM 28.2.9.79, F	705	435	44	40	—
FM 51885, F	690	405	41	38	—
AM 133205, M	665	395	48	40	—
Glironia venusta					
Marshall (1978c)	160–205	195–225	27–31	22–25	—
		Subfamily Didelphinae			
Chironectes minimus minimus					
Marshall (1978d)	645–745	270–400	60–72	22–31	604–790
CBF 2294, F	658	380	66	30	655
AM 264572, M	693	357	54	28	576
Didelphis a. albiventris					
3 adult males	800–870	400–410	56–65	62–68	—
D. a. pernigra					
3 adult females	720–801	330–396	52–62	64–64	—
2 adult males .	710–750	380–385	58–60	48–55	—
D. marsupialis marsupialis					
3 adult males	770–810	380–390	62–66	54–60	1500
3 adult females	710–770	360–380	52–60	52–55	1000
MSU 28236, M	1000	360	52	66	—
Gracilinanus aceramarcae					
AM 72568, F	195	112	16	16	—
UM 156004, F	229	138	9	21	21
UM 156005, M	245	142	16	20	23

TABLE 2
(*Continued*)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)
G. agilis buenavistae					
AM 262401, M	195	111	14	17	12
AM 260031, M	206	113	16	17	17
BM 28.2.9.93, F	245	135	17	16	—
BM 26.12.4.91, F	240	140	16	17	—
G. a. unduaviensis					
UM 156007, F	267	152	18	22	27
AM 72563, M	222	120	17	16	—
Lutreolina c. crassicaudata					
AM 210420, M	580	280	45	29	472
US 364720, F	450	270	41	15	125
FM 114716, F	422	205	35	20	—
Marmosa lepida					
ANSP 14276, M	330	175	19	26	—
BM 26.12.4.94, F	265	145	19	18	—
M. murina					
UM 155828, F	252	146	16	21	23
Marmosops dorothea					
AM 72550, F juv.	248	137	17	—	—
AM 72558, F	305	169	17	19	—
AM 262409, F	342	197	22	27	47
BM 26.1.5.25, M	226	186	21	25	—
M. impavidus					
AM 38718, F	245	145	18	20	—
UM 156014, M	220	127	15	20	21
UM 126680, M	263	147	14	22	30
M. noctivagus keaysi					
AM 72567, F	279	164	18	—	—
AM 262402, M	304	184	20	22	36
AM 262403, M	290	167	20	21	35
AM 262404, F	290	164	20	20	37
M. parvidens					
AM 268938, F	210	120	15	21	17
Metachirus nudicaudatus bolivianus					
AM 38716, F	440	245	40	34	—
AM 244617, M	621	349	46	36	—
AM 246453, M	581	323	47	37	429
Micoureus constantiae budini					
US 390573, M	338	198	24	23	73
CM, 3 M	310–375	180–205	22–23	25–27	—
M. c. constantiae					
Beni, 3 M, 1 F	376–425	200–227	24–27	27–30	92–148
M. regina					
AM 72555, M	364	202	26	28	—
UM 126679, F	338	188	19	26	52
UM 126676, M	350	205	23	28	67
Monodelphis adusta					
AM 264562, F	140	46	12	11	16
MSB 68336, F	121	41	13	11	11

TABLE 2
(*Continued*)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)
M. brevicaudata					
UM 126682, M	216	78	18	21	53
UM 126683, F	213	83	22	23	49
UM 122684, M	218	90	22	20	48
M. domestica					
CM 5010, M	210	70	18	24	—
AM 260024, M	267	96	23	24	100
MSB 55072, M	239	85	20	24	110
Porvenir, 5 M	212–235	68–84	19–22	22–24	49–71
Porvenir, 3 F	206–230	77–83	18–20	20–21	43–61
M. emiliae					
L. H. Emmons 837	189	58	19	15	52
BM 20.7.14.44, old M	221	63	24	17	—
FM 58955, ad. F	188	56	22	14	—
M. kunsi					
ANSP 18191, M	113	42	12	12	—
AM 263968, F subadult	115	41	12	10	8
M. osgoodi					
CM 5242, M	158	62	15	9	—
CM 5248, M	154	60	14	9	—
FM 74861, M	170	75	12	10	—
AM 264922, F	152	52	19	11	14
M. species uncertain					
AM 263548, F	168	60	15	19	23
Philander opossum canus					
AM 210411, M	582	319	45	42	418
AM 210412, M	541	294	42	35	337
Thylamys macrura					
AM 263549, M	292	166	19	24	36
T. pallidior					
68 km N Camargo, 1 F, 3 M	183–210	109–114	13–15	17–24	10–17
Challapata, 5 F, 2 M	177–221	93–117	13–15	19–24	—
T. pusillus					
AM 261268, M	195	105	12	20	19
35 km SE Villa Montes, 4 F, 9 M	161–220	90–114	11–13	19–22	12–27
T. venustus					
UM 156033, F	265	133	17	29	42
CM 5231, M	190	110	13	22	—
AM 40790, F	205	109	15	—	—
CM 5296, ?	210	110	13	24	—
AM 38996, F	250	140	15	24	—
		Family Caenolestidae			
Lestoros inca					
M, CBF 4000	235	128	25	16	31

TABLE 3

Cranial Measurements (in mm) of the Marsupialia

	Condylobasal Length	Palatal Length	Dental Span	Lambdoidal Breadth	Interorbital Breadth	Supraorbital Breadth	Postorbital Breadth
			Family Didelphidae Subfamily Caluromyinae				
Caluromys lanatus lanatus							
FM 114649, F	54.4	28.9	17.0	20.2	9.9	15.0	8.0
FM 25265, M	57.9	30.0	17.7	22.2	10.7	16.9	8.4
FM 51885, F	56.2	29.4	16.8	21.3	10.4	15.2	9.1
AM 133205, M	60.8	32.8	17.5	23.4	12.5	20.7	8.6
Glironia venusta							
Marshall (1978c)	43.5–43.7	—	—	—	7.1–7.5	9.3–11.0	—
			Subfamily Didelphinae				
Chironectes m. minimus							
AM 96760, M, Brazil	67.5	41.2	24.1	25.8	13.4	16.0	8.2
AM 264572, M subadult	64.5	40.0	23.9	24.1	12.5	14.7	8.0
MSB 68329, M	61.2	40.9	23.0	24.2	12.0	14.0	8.1
MSB 68330, M	65.4	40.9	23.0	24.2	12.0	14.0	6.6
Didelphis a. albiventris							
2 adult males	100.8–115.8	58.2–66.7	27.6–31.6	31.6–34.6	20.1–24.8	21.4–25.8	9.7–10.6
D. a. pernigra							
3 adult females	90.3–93.0	54.2–56.2	26.8–29.1	28.3–30.1	17.2–18.6	18.6–21.8	10.0–11.2
3 adult males	92.2–97.0	56.0–58.5	28.3–30.3	28.6–30.7	19.0–21.2	20.4–25.0	10.8–12.6
D. marsupialis marsupialis							
3 adult males	97.0–103.2	60.6–64.6	29.8–31.4	31.0–32.2	20.3–21.4	23.0–25.5	12.0–12.5
3 adult females	86.9–91.4	53.6–57.0	28.2–28.6	26.8–27.2	16.6–18.8	20.9–22.1	11.3–11.7
AM 210438, F	103.6	65.5	30.3	30.2	22.8	26.9	12.4
AM 246455, M	109.4	65.7	32.3	33.2	21.7	22.6	11.6
Gracilinanus aceramarcae							
AM 72568, F	25.8	14.4	8.0	10.3	4.9	no constriction	
G. agilis buenavistae							
BM 28.2.9.93, F	27.5	14.4	8.8	11.0	4.9	—	—
BM 26.12.4.91, F	27.0	14.5	8.4	10.6	4.8	5.4	5.3
G. a. unduaviensis							
AMNH 72563, M	[27.7]	15.2	9.3	10.8	—	—	—
Lutreolina c. crassicaudata							
4 M	48.1–69.4	26.7–37.7	15.5–19.1	16.3–24.1	7.0–9.9	8.8–12.8	7.2–7.8
2 F	47.1–54.6	26.2–30.0	14.8–18.0	16.4–18.0	7.6–8.3	9.3–11.0	7.4–7.6
Marmosa lepida							
BM 26.12.4.94, F	29.8	16.7	9.1	11.7	5.1	7.0	6.5
M. murina							
UM 155828, F	29.4	16.4	11.6	12.2	5.7	—	—
Marmosops dorothea							
BM, 3 adult males	31.6–36.8	18.1–20.6	9.9–11.0	11.4–13.1	5.3–6.3	6.3–6.4	5.8–6.3
BM 1.6.7.79, F	33.8	19.2	11.0	12.0	5.8	—	—
AM 72558, F	35.5	20.0	10.8	12.7	6.6	6.9	6.8
M. impavidus							
UM 156014, M	26.0	14.6	8.1	9.9	5.7	5.8	—
UM 136680, M	30.1	17.0	10.1	—	—	—	—
M. noctivagus keaysi							
BM 34.9.2.180, M	34.4	19.6	11.4	12.7	6.5	7.8	7.7
BM 34.9.2.181, M	33.4	19.3	10.9	12.2	6.3	6.8	6.7
BM 34.9.2.182, F	34.4	19.9	10.7	12.3	6.4	6.9	6.9
M. parvidens							
AM 268938, F	26.9	15.0	8.4	9.8	5.2	5.6	5.5
Metachirus nudicaudatus bolivianus							
AM 246453, M	57.8	33.6	18.0	17.8	12.6	—	9.6
AM 248701, M	56.2	32.5	17.8	17.0	—	—	9.0
AM 210417, M	47.3	27.6	16.8	15.4	—	—	8.6

TABLE 3
(*Continued*)

	Condylo-basal Length	Palatal Length	Dental Span	Lamb-doidal Breadth	Inter-orbital Breadth	Supra-orbital Breadth	Post-orbital Breadth
Micoureus constantiae budini							
CM 4941, M	—	23.0	13.5	16.3	7.5	10.1	6.2
CM 5049, F	—	21.6	13.4	15.9	7.2	9.3	6.0
M. c. constantiae							
BM 34.9.2.183, F	39.2	22.6	13.4	14.4	6.9	8.4	6.8
Beni, 3 M, 1 F	42.2–44.8	23.4–24.9	13.6–14.9	14.8–16.7	6.8–8.1	8.9–10.9	6.2–6.9
M. regina							
AM 72555, M	40.8	22.8	13.7	15.6	7.4	9.6	7.4
Monodelphis adusta							
AM 264562, F	24.8	13.2	8.1	10.1	4.7	5.0	4.8
M. brevicaudata							
UM 126683, F	35.8	19.6	11.7	13.6	—	—	5.9
M. domestica							
CM 5010, M	38.6	21.8	12.9	13.4	7.7	7.7	6.2
AM 260024, M	42.7	23.6	14.4	15.9	—	—	5.7
Porvenir, 5 M	35.7–39.2	19.8–22.1	12.5–13.4	13.5–15.1	—	—	5.9–6.5
Porvenir, 3 F	34.6–38.2	19.6–19.9	11.9–12.6	13.2–14.0	—	—	5.8–6.0
M. emiliae							
BM 20.7.14.44, M	38.4	21.2	11.3	—	8.6	—	5.7
FM 58955, F	34.9	18.8	11.2	—	11.3	—	5.7
M. kunsi							
US 461348, M	23.2	12.1	—	—	4.4	—	—
ANSP 18191, M	—	10.9	—	—	4.4	—	—
AM 263968, F subadult	20.9	10.8	7.2	8.6	4.0	4.4	4.4
M. osgoodi							
CM 5242, M, holotype	25.9	14.1	7.6	10.0	6.5	6.5	5.7
CM 5248, M	25.4	13.9	8.0	9.9	6.1	6.1	5.6
FM 74861, M	25.9	14.2	7.5	9.6	—	—	5.3
M. species A							
AM 263548, F	29.8	16.3	10.0	11.8	—	5.3	5.2
Philander opossum canus							
AM 210411, M	70.4	41.1	20.3	21.8	11.5	12.4	8.4
AM 210412, M	63.8	37.6	19.7	20.6	10.2	11.8	7.8
Thylamys macrura							
AM 263549, M	34.0	19.1	10.2	12.2	5.9	5.9	5.9
T. pallidior							
Challapata, BM, 3F	25.2–28.2	13.8–15.3	8.4–9.0	10.0–10.7	4.3–4.6	5.0–5.2	5.0–5.2
Challapata, BM, 2F	26.8–27.0	14.4	8.8–8.9	10.4–10.5	4.3–4.4	5.0–5.2	5.0–5.2
T. pusillus							
BM 23.12.12.15, M	25.2	13.5	8.4	10.2	4.4	4.8	4.8
AM 261268, M	25.9	13.9	8.2	10.2	4.0	—	—
35 km SE Villa Montes, 4 M, 1 F	23.6–24.6	12.6–13.4	7.8–8.3	9.4–9.9	3.6–4.4	—	—
T. venustus							
CM 5231, M	25.1	13.6	8.7	10.4	4.0	none	—
CM 5296, ?	—	14.7	8.7	—	4.3	5.5	5.5
Carlazo, BM, 3M	30.5–31.6	16.0–17.2	9.0–9.5	11.4–11.6	4.7–4.8	4.7–4.9	4.8–5.0
Carlazo, BM, 2F	28.6–29.4	15.0–15.7	9.5–9.6	10.7–11.5	4.7–4.8	5.2	5.3
			Family Caenolestidae				
Lestoros inca							
M, CBF	40.0–29.9	16.1	—	—	—	—	7.8

TABLE 4
External Measurements (in mm) of the Xenarthra

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in kg)
		Family Bradypodidae			
Bradypus variegatus					
MSB 55206, F	620	55	149	19	—
CM 2169, F	630	70	110	20	—
CM 2179, F	630	70	120	20	—
CM 1987, F	550	78	120	10	—
		Family Choloepidae			
Choloepus hoffmanni					
AM 209941, F	550	30	133	28	5.2
		Family Dasypodidae Subfamily Chlamyphorinae			
Chlamyphorus r. retusus					
CM 2139, F	153	37	31	5	—
US 283134, M	199	38	39	—	—
		Subfamily Dasypodinae Tribe Dasypodini			
Dasypus kappleri beniensis					
Lönnberg, F	955	400	—	—	—
D. n. novemcinctus					
Near Casarabe, 2 M	810, 790	380, 345	93, 95	41, 40	—
Near Casarabe, 3 F	770–835	326–353	88–98	32–40	—
Ibiato, 60 M	777.2 ± 40.1	348.4 ± 30.2	93.1 ± 5.5	41.3 ± 3.0	5.02 ± 0.720
	670–845	255–411	80–106	33–47	3.5–6.5
Ibiato, 67 F	766.7 ± 41.0	340.0 ± 24.8	89.0 ± 6.2	40.7 ± 3.5	4.78 ± 0.670
	665–887	270–395	64–105	30–48	3.5–6.25
D. septemcinctus (see text)					
		Tribe Euphractini			
Chaetophractus nationi					
ANSP 19372, M, young	295	97	50	31	—
CBF 1624, M	388	109	61	35	1.2
C. vellerosus					
AM 260318, F	440	152	72	30	0.95
C. villosus					
BM 1975.577, F	ca. 410	120	—	—	—
Euphractus sexcinctus boliviae					
LACM 60643, F	731	240	87	42	7.26
Buenavista, FM, 3 M	540–860	185–320	80–90	30–40	—
Buenavista, FM, 1 F	810	310	—	32	—
Ibiato, 5 M, 4 F	556–610	162–210	55–79	33–37	3.3–5.7
		Tribe Priodontini			
Cabassous chacoensis (none from Bolivia)					
CM 670673, holotype, M	402	96	61	15	—
C. unicinctus squamicaudis					
AM 209943, young M	502	166	76	34	1.78
Priodontes maximus (no Bolivian data)					
Estimates	1475	500	185	60	30

TABLE 4
(*Continued*)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in kg)
			Tribe Tolypeutini		
Tolypeutes matacus					
LACM 246459, F	302	66	41	20	1.25
LACM 246461, M	314	69	43	27	1.4
LACM 246460, M	320	64	43	22	1.5
Near Capirenda, 3 M	304–328	48–80	38–45	22–29	1.48–1.59
			Family Myrmecophagidae		
Cyclopes didactylus catellus					
Santa Cruz, CM, 3 F	320–400	160–200	30–32	11–17	—
Myrmecophaga t. tridactyla					
Lönnberg, F	1915	670	172	—	—
Lönnberg, FM	1945	690	170	—	—
Tamandua tetradactyla					
AM 209938, F	1035	498	84	55	3.86
AM 211656, F	895	455	91	45	2.9
AM 211657, F	1096	512	103	55	5.1
AM 211660, F	1135	535	100	51	5.45
Ibiato, M	1128	548	108	52	6.25

TABLE 5
Cranial Measurements (in mm) of the Sloths

	Condylonasal Length	Basal Length	Palatal Length	Zygomatic Breadth	Inter-orbital Breadth	Post-orbital Breadth
			Family Bradypodidae			
Bradypus variegatus						
Buenavista, ANSP 14288, M	80.2	64.4	20.9	53.8	26.1	26.1
Buenavista, ANSP 14289, F	83.2	65.7	19.7	50.1	24.9	24.9
Buenavista, BM, 2 F	81.9, 80.9	67.6, 64.6	21.8, 21.3	53.2, 54.9	25.8, 26.0	27.8, 26.7
Buenavista, BM, 1 M	83.0	65.8	21.8	55.1	25.7	24.0
			Family Choloepidae			
Choloepus hoffmanni						
AM 209941, F	102.4	90.9	39.7	63.5	43.3	—
MNLP 797, F	109.8	98.8	50.0	68.9	32.8	33.9

TABLE 6

Cranial Measurements (in mm) of the Dasypodidae

	Condylo-nasal Length	Palatal Length	Palatal Width	Rostral Length	Inter-lacrimal Breadth	Breadth of Braincase
		Subfamily Chlamyphorinae				
Chlamyphorus retusus retusus						
CM 2139	43.0	25.1	7.1	23.4	—	28.0
		Subfamily Dasypodinae Tribe Dasypodini				
Dasypus kappleri beniensis						
Peru, AM 76574, M	114.1	81.2	13.8	73.0	35.3	34.7
D. n. novemcinctus						
AM 262659, sex ?	90.0	60.9	11.0	51.2	32.3	31.4
BM 1901.2.1.34, M	96.8	64.9	11.5	57.1	31.3	29.8
AM 262658, sex ?	93.0	60.8	12.1	53.0	32.8	31.5
D. septemcinctus						
Brazil, FM 52354, F	61.4	39.0	7.9	36.8	21.8	—
		Tribe Euphractini				
Chaetophractus nationi						
CBF 1624, M	71.9	41.2	9.9	33.3	32.8	29.3
C. vellerosus						
BM 47.11.22.20, sex ?	60.4	34.7	8.1	28.2	—	25.7
AM 260318, F	77.1	30.2	11.5	—	35.0	28.5
C. villosus						
BM 1975.577, F	72.0	40.8	9.8	32.2	32.2	31.1
Euphractus sexcinctus boliviae						
LACM 60643, F	119.9	68.9	16.6	—	43.5	45.3
BM 26.1.12.20, M	108.9	64.5	15.3	51.9	46.2	41.3
BM 1846.7.28.11, F	116.0	69.5	17.3	57.1	50.7	46.8
		Tribe Priodontini				
Cabassous chacoensis						
CM 67067, holotype, M	70.7	41.7	10.7	31.0	29.8	30.9
C. unicinctus squamicaudis						
AM 209943, M yg.	79.1	47.1	10.9	37.4	31.9	30.8
Priodontes maximus						
CM 20942, sex ?	190	120	29	105.7	58.1	62.3
CM "5055"	190	122	29	107.0	61.1	63.8
		Tribe Tolypeutini				
Tolypeutes matacus						
LACM 27350, M	70.8	42.0	8.7	34.8	28.2	25.6
LACM 27349, M	66.0	38.7	2.8	32.2	25.8	23.6
LACM 62848, M	67.3	40.7	7.0	33.5	26.3	24.2

TABLE 7
Cranial Measurements (in mm) of the Myrmecophagidae

	Occipito-nasal Length	Inter-orbital Breadth	Inter-lacrimal Breadth	Rostral Length	Nasal Length	Breadth of Braincase
Cyclopes didactylus catellus						
AM 262656, M	52.7	9.6	11.0	16.5	15.2	24.4
CM 1934, F	54.0	9.6	11.4	16.7	16.2	25.1
Myrmecophaga t. tridactyla						
BM 28.2.9.75, ?	370	47.9	44.8	245	180.4	64.6
Tamandua tetradactyla						
AM 209938, F	124.3	25.5	30.4	56.6	41.7	43.1
AM 211656, F	109.6	23.5	29.4	45.1	34.6	36.5
AM 211657, F	128.0	23.3	33.0	60.0	44.2	39.7
AM 211660, F	118.3	25.9	32.1	50.2	38.6	40.7

TABLE 8
External Measurements (in mm) of the Chiroptera

	Total Length	Tail Length	Length of Hind Foot	Length of Tibia	Length of Ear	Length of Forearm	Length of Thumb	3rd Finger Formula	Weight (in g)
Family Emballonuridae									
Peropteryx kappleri									
5 specimens	62–68	14–16	7–8.5	—	11–19	46.9	—	—	7.6
P. m. macrotis									
AM 209227, M	67	17	8	—	13	—	—	—	—
AM 209228, F	73	19	10	18	15	46	6	42-11-22	—
AM 209229, M	60	14	11	14	14	42	5	38-10-20	—
Rhynchonycteris naso									
Río Iténez, 4 F	41–65	13–17	6–7	13–15	11–14	39–41	4	(39–43)(11–12)(16)	6–7
Río Iténez, 6 M	50–66	12–20	7–8	14	11–13	39–40	4	40-10-17	4–6
Saccopteryx bilineata									
Río Mamoré, 11 F, 3 M	72–81	18–24	10–11	—	14–16	44–51	—	—	9.4–13.3
Versalles, 2 M, 5 F	74–81	21–27	11–13	20–22	15–20	45–49	6	(45–48)(14–16)(22–23)	—
S. leptura									
AM 209225, M	58	15	7	—	14	40	—	—	4
AM 209226, F	61	18	7	—	14	42	—	—	6
AM 262418, F	63	11	7	15	13	40	4	38-12-19	4
AM 210514, F	65	18	10	21	15	41	4	40-13-21	8
Family Noctilionidae									
Noctilio albiventris affinis									
38 km W of Trinidad, 6 F	91–95	22–24	16–18	—	22–24	60–65	—	—	31–50
4 km above Costa Marques, 6 F	84–92	17–21	16–18	20–21	23–24	61–65	8	(51–55)(13–18)(51–54)	24–34
4 km above Costa Marques, 4 M	88–96	16–23	17–19	23	23–24	62–69	8	54-14-52	33–36
AM 209239, F	78	14	17	20	20	62	8	53-12-50	30
N. leporinus rufescens									
AM 260048, F	112	25	30	39	28	87	11	80-21-76	71
UM 126696, M	132	28	29	—	29	82	—	—	62
AM 261371, F	111	22	23	38	27	84	9	79-21-(58)	52
AM 261372, M	125	30	31	40	28	89	11	81-22-76	65

TABLE 8
(*Continued*)

	Total Length	Tail Length	Length of Hind Foot	Length of Tibia	Length of Ear	Length of Forearm	Length of Thumb	3rd Finger Formula	Weight (in g)
				Family Mormoopidae					
Pteronotus gymnonotus									
Venezuela, AM 32085, F	85	26	12	20	12	52	6	48-10-16	—
P. parnellii rubiginosus									
Venezuela, AM 260001, F	97	26	14	25	20	63	7	54-10-18	24
P. personatus personatus									
Venezuela, AM 32128, F	63	15	11	15	11	44	6	42-8-12	—
				Family Phyllostomidae Subfamily Phyllostominae					
Chrotopterus auritus									
AM 209353, M	117	10	26	38	45	80	18	59-31-35	86
Lonchorhina aurita									
CM 1890, M	100	45	13	21	25	50	5	46-16-24	—
Macrophyllum macrophyllum									
AM 209320, M	78	35	14	—	17	34.5	—	—	6
AM 209321, M	78	35	13	—	15	—	—	—	5
AM 262424, M	88	35	14	14	18	37	5	36-14-18	8
MSB 57010, M	90	38	12	16	20	40	10	36-15-18	8
Micronycteris daviesi									
CBF 2908, M	65	5	10	17	20	54	15	52-20-32	18
M. m. megalotis									
UM 126843, M	65	11	10	—	18	—	—	—	5
M. minuta									
UM 126729, M	73	10	10	16	21	35	4	27-11-12	7
UM 127173, M	70	12	9	15	19	36	6	30-11-12	8
CBF, 2 M	65–67	8–12	11–12	—	11–12	—	—	—	—
M. nicefori (no Bolivian data)									
AM 266019, French Guiana	65	10	13	16	19	38	7	34-13-17	7
Mimon crenulatum longifolium									
AM 209323, F	92	26	13	21	26	53	7	54-16-29	20
CBF 1415, 1418, F	82–91	25–30	6–10	—	22–27.5	51	—	—	14–17
Phyllostomus d. discolor									
AM 260049, F	104	19	16	26	29	69	11	62-16-30	43
San Joaquín, 4 F	88–99	10–18	15–20	—	19–22	59–62	—	—	31–32
San Joaquín, 6 M	85–95	9–16	10–20(?)	—	15–21	57–64	—	—	18–31
P. elongatus									
AM 209331, M	112	31	17	—	32	—	—	—	—
AM 210671, M	118	28	18	26	30	68	11	62-17-32	49
AM 210678, F	101	25	16	—	32	—	—	—	49
P. h. hastatus									
San Joaquín, 15 F	95–115	—	25–27	32	15–30(?)	78–87	13	(78–81)(19–21)(37–38)	72–103
AM 261377, F	138	21	21	30	28	89	13	81-19-37	110
FM 50989, M	125	25	20	—	35	86	—	—	—
P. stenops boliviensis									
413, holotype, F	116	16	17	29	22	73	12	65-23-30	62
P. stenops stenops									
AM 205371, F	—	—	20	27	18+	71	11	69-23-31	—
Tonatia brasiliense									
CBF 178, M	65	?	9	?	21	37	?	?	12
CBF 179, F	70	14	10	18	21	35	—	28-11-13	14
T. carrikeri									
AM 209322, F	82	12	10	18	28	47	10	38-16-18	22
T. saurophila maresi									
CBF 177, M	80	10	15	—	25	52	—	—	34

TABLE 8
(*Continued*)

	Total Length	Tail Length	Length of Hind Foot	Length of Tibia	Length of Ear	Length of Forearm	Length of Thumb	3rd Finger Formula	Weight (in g)
T. s. sylvicola									
LSU 22713, F	—	—	14	25	31	55	—	45-20-22	28
AM 262425, M	118	19	14	24	29	55	9	46-20-20	20
CM 2761, M	97	19	13	25	32	56	10	46-20-23	—
Trachops c. cirrhosus									
AM 261378, M	104	14	20	24	32	61	11	52-22-30	32
AM 209351, F	100	19	20	25	32	61	10	50-20-30	35
Vampyrum spectrum									
AM 261379, M	161	0	30	45	49	111	25	80-43-47	200
Subfamily Lonchophyllinae									
Lonchophylla thomasi									
MSU 32858, F	66	7	8	11	12	33	—	33-12-15	—
FM 96072, F	56	—	12	—	10	39	—	—	15
AM 210688, F	60	8	8	—	12	31	5	32-13-16.5	8
AM 262434, M	53	—	8	11	9	31	5	33-12-16	6
AM 262429, F	51	4	7	—	11	—	—	—	8
AM 209358, F	50	—	11	12	15	30	5	32-13-16.5	8
Subfamily Glossophaginae									
Anoura caudifer									
Near Caranavi, LSU, 4 F	51–64	2–3	9–13	13	12–14	35–37	6	37-12-19	9–11
Near Caranavi, AM, 2 M, 2 F	58–65	2–7	11–13	11	10–14	34–37	6	(35–37)(11–12)(18–20)	11–12
A. cultrata									
LSU 22960, F	—	2	12	16	15	41	8	42-14-22	14
LSU 22962, F	—	4	11	16	14	41	7	43-13-22	16
A. geoffroyi peruana									
Sacramento Alto, 2 F	—	0	10–11	14–15	14	43	6	44-14-21	13
Sacramento Alto, 2 M	—	0	12–14	15–17	14	43–48	6–7	44-14-22	14–16
AM 246472, F	70	0	15	13	13	44	7	43-14-22	15
AM 246473, M	67	0	14	14	15	46	6	45-15-23	16
AM 263192, M	74	0	12	15	14	46	7	42-15-22	18
AM 263193, M	68	0	13	14	14	44	6	42-14-21	17
Choeroniscus intermedius									
AM 248759, F	63	0	10	13	14	37	6	37–12–18	11
C. minor									
AM 262435, M	69	8	9	—	10	34	—	—	6
Glossophaga s. soricina									
Río Quiser, 4 F	65–67	7–9	9–12	—	14	36–37	—	—	12
Río Quiser, 4 M	62–70	7–9	10–11	—	14	34–37	—	—	9–11
Rurrenabaque, 6 M, 7 F	57–74	5–11	10–12	12–14	13–15	32–35	6	(32–35)(12–14)(14–16)	8–12
Lichonycteris obscura									
AM 244621, M	58	11	9	11	10.5	34	6	35-14-18	—
Subfamily Carolliinae									
Carollia brevicauda									
Serranía Pilón, 6 M	63–72	7–13	11–14	17–18	16–20	38–40	—	—	12–15
Serranía Pilón, 8 F	60–69	0–11	12–14	17–18	18–20	38–40	—	—	13–14
Near Caranavi, AM, 4 M, 4 F	66–73	5–7	11–13	13–16	19–20	37–40	7–9	(35–39)(15–18)(19–22)	13–16

TABLE 8
(*Continued*)

	Total Length	Tail Length	Length of Hind Foot	Length of Tibia	Length of Ear	Length of Forearm	Length of Thumb	3rd Finger Formula	Weight (in g)
C. castanea									
Near Villa Tunari, UM, 2 F	75–76	11–12	11–12	—	17–18	36	—	—	11–12
Near Villa Tunari, UM, 7 M	69–79	10–12	11–13	—	16–20	34–38	—	—	10–15
Near Villa Tunari, AM, 4 M, 4 F	58–65	6–10	10–12	13–14	16–19	35–38	7–8	(32–36)(14–16)(20–21)	12–14
C. perspicillata									
Near Casarabe, 10 F	67–78	9–13	14–16	18–21	18–20	42–46	8–9	(41–42)(16–17)(22–24)	—
Near Casarabe, 5 M	70–73	9–12	14–15	21–22	18–20	41–44	—	—	—
Rhinophylla pumilio									
Near Puerto Linares, MSU, 3 F	50–52	0	8–9	13	12–14	?	7–8	(33–34)(15)(19)	—
Near Puerto Linares, MSU, 3 M	45–55	0	6–9	—	11–13	32	7	(33–34)(15–18)(17–18)	—
AM 248892, M	51	0	10	—	14.5	35	—	—	8
Agua Dulce, 5 M, 4 F	49–56	0	6–10	12–14	11–16	34–37	7–8	(33–34)(14–15)(19–20)	8–10
				Subfamily Stenodermatinae					
Artibeus anderseni									
Vicinity of Casarabe and Puerto Almacen, 7 M, 3 F	49–55	0	9–11	14–15	14–16	36–39	—	—	—
Independencia, 4 M, 4 F	50–55	0	8–10	12–14	13–15	35–38	6–7	(32–36)(12–14)(17–19)	8–12
A. g. glaucus									
Near Villa Tunari, UM, 3 M, 2 F	65–72	0	10–12	13–14	16–18	38–41	7–8	(36–40)(14–15) (18–21)	11–14
35 km N of Caranavi, AM, 5 F, 4 M	52–60	0	11–13	13–14	16–18	40–42	7–8	(36–40)(13–15)(19–23)	12–16
A. glaucus gnomus									
AM 209584, F	—	0	10	—	15	—	—	—	15
Santa Ana de Madidi, 6 F, 5 M	54–68	0	10–11	15	16–17	35–38	—	—	9–12
A. hartii									
UM 155846, ?	68	0	12	12	17	40.0	8	37-14-18	15
MNLP FH181, M	60	0	10	13	15	38	9	36-14-18	15
A. jamaicensis fallax									
6 km W Casarabe, 6 F, 3 M	80–87	0	16–20	24–28	20–23	62–68	—	—	—
Caranavi, MSU, 6 F, 8 M	81–89	0	14–17	—	20–23	64–67	—	—	62–105
Near Costa Marques, 2 F, 2 M	83–93	0	19–20	21–22	23–25	62–64	11	(58–62)(18–19)(29–31)	50–63
A. l. lituratus									
Caranavi, MSU, 11 F, 8 M	86–106	0	14–18	—	19–26	69–74	—	—	84–120
Río Nareuda, 3 F, 4 M	85–103	0	18–21	—	21–25	71–79	—	—	50–80
Guayaramarin, AM, 3 F, 3 M	88–100	0	16–19	25–28	19–23	66–75	11–15	(64–70)(22–24)(35–39)	51–74
A. obscurus									
50 km N Yacuma, 5 M, 1 F	80–82	0	15–17	—	19–22	56–62	—	—	31–40
Río Nareuda, 8 M, 2 F	72–90	0	14–17	—	20–23	59–69	—	—	34–50
Near Caranavi, 2 F, 2 M	77–83	0	17–19	21–25	21–24	58–62	10–12	(52–57)(18–20)(29–32)	31–40

TABLE 8
(*Continued*)

	Total Length	Tail Length	Length of Hind Foot	Length of Tibia	Length of Ear	Length of Forearm	Length of Thumb	3rd Finger Formula	Weight (in g)
Chiroderma s. salvini									
AM 261077, F	76	0	14	—	18	53	—	—	37
AM 246625, F	75	0	14	—	20	53	—	—	34
AM 261667, F	85	0	13	18	21	51	10	49-20-30	40
LSU 23313, M	—	0	13	19	18	53	10	52-20-29	29
AM 262537, M	77	0	13	17	19	49	8	47-18-28	24
C. t. trinitatum									
Near Puerto Linares, MSU, 3 F	63–70	0	10–11	—	14–19	41–44	—	—	—
Near Puerto Linares, LSU, 3 M, 2 F	—	0	10–12	15–16	15–16	41–43	8–9	(41–49)(14–16)(22–24)	15–19
AM 261675, F	69	0	13	16	18	42	—	—	18
C. v. villosum									
Independencia, AM and MSB, 6 F, 2 M	70–77	0	11–13	—	14–18	45–51	—	—	19–23
Near Costa Marques, 6 F, 3 M	65–75	0	11–14	15–16	17–18.5	46–50	8–10	(44–49)(15–17)(22–26)	19–31
Mesophylla m. macconnelli									
Near Puerto Linares, 3 F, 1 M	40–51	0	6–8	—	13–15	32–33	7	(31–32)(11–14)(16–17)	—
AM 246626, F	51	0	11	12	14	33	8	31-13-17	9
Santa Rosa, AM and MSB, 2 F, 1 M	49–53	0	8–10	11	11–13	31–34	6–7	(30–31)(11–12)(15–16)	6–7
AM 248886, M	50	0	10	10	15	31	7	29-12-15	8
AM 248887, M	48	0	10	10	14	32	7	29-12-16	8
Platyrrhinus brachycephalus									
US 564320, F	65	0	11	14	19	40	9	40-14-22	21
US 564321, F	65	0	11	15	17	40	10	39-14-23	20
P. dorsalis									
UM 126759 M	76	0	12	15.8	19	45	16	44.5-18-24	21
UM 126760 M	80	0	13	16	19	47	16	44-18-25	23
Near Santiago de Chiquitos, 9 M, 6 F	65–75	0	11–15	—	17–20	45–50	—	—	22–33
Near Caranavi, AM, 5 F	72–74	0	13–15	17–20	18–20	47–49	9–11	(43–46)(17–19)(25–26)	25–28
P. helleri incarum									
Near Casarabe, 5 F, 1 M	59–63	0	10–11	14–16	16	38–42	—	—	—
Santa Ana de Madidi, AM and MSB, 30 F, 10 M	54–66	0	10–14	14–16	16–19	33–40	—	—	10–19
LSU 22718, sex?	—	—	—	—	—	—	7	37-8-20	12
Estancia Cachuela Esperanza, AM, 2 F, 1 M	60–68	0	11–13	12–15	15–17	38–39	8–9	(35–36)(11–13)(20–21)	12–15
P. infuscus									
Near Caranavi, AM, 2 F, 1 M	84–86	0	15–17	21–23	22–24	56–58	12–13	(51–56)(21–25)(30–32)	43–55
Near Caranavi, LSU, 10 F, 2 M, 1 ?	—	—	15–17	20–24	18–21	54–59	11–12	(55–59)(20–23)(27–33)	46–54
P. l. lineatus									
Santiago, FM, 10 M, 9 F	60–79	—	10–13	16 (*n*=1)	18–21	46–48	10	(46–48)(16–17)(24–25)	18–28
Roboré, AM and MSB, 1 F, 2 M	62–71	0	11–13	18–19	15–22	48–49	—	—	19–30
AM 210805, M	68	0	11	—	16	46	9	44-16-23	26
AM 210806, M	66	0	11	—	16	45	8	43-15-23	25

TABLE 8
(*Continued*)

	Total Length	Tail Length	Length of Hind Foot	Length of Tibia	Length of Ear	Length of Forearm	Length of Thumb	3rd Finger Formula	Weight (in g)
P. l. nigellus									
Near Caranavi, AM, 3 M, 1 F	60–70	0	13	14–15	18–19	40–44	8–9	(38–41)(15–16)(20–22)	19–23
Near Caranavi, LSU, 3 M, 3 F	—	0	10–12	15	15–16	40–44	9–10	(39–44)(15–17)(21–23)	18–26
P. vittatus									
Colombia, AM 15100, F	—	0	15	20	—	60	12	55-22-32	—
Pygoderma bilabiatum magna									
Amboró, AM, 2 F, 3 F	66–75	0	13–15	18	18–21	40	10	(41–44)(17–18)(28–29)	18–20
UM 156057, F	87	0	15	—	22	44.2	—	—	27
Sphaeronycteris toxophyllum									
AM 261765, F	58	0	17	—	17	37		—	16
AM 262637, M	63	0	9?	—	14	40	—	—	14
AM 209740, F	58	0	12	14	15	41.5	8	42-15-22	—
AM 209741, M	85	0	12	16	17	39	8	41-14-21	—
Sturnira erythromos									
AM 246574, F	61	0	13	17	16	41	9	39-14-17	15
AM 246569, M	56	0	13	16	17	43	10	39-15-18.6	14
AM 246571, F	64	0	14	16	17	44	10	40-16-19	14
AM 246572, M	65	0	17	16	16	42	8	37-15-18	17
S. lilium lilium									
Opp. Cascajal, 3 F, 1 M	57–60	0	11–13	16	11–13	41–42	8–9	(40–42)(14–15)(17–18)	18–20
Near Villa Tunari, AM, 2 M, 1 F	61–68	0	12–14	15–16	16	41–43	9–10	(39–40)(14)(18–20)	18–26
S. magna									
Serranía Bellavista, AM, 3 M, 1 F	84–90	0	18–21	24–25	18–23	59–63	12–13	(58–60)(22–24)(28–29)	42–48
Serranía Bellavista, LSU, 4 M, 3 F	—	0	17–19	23–25	19–23	55–60	11–14	(58–61)(21–23)(29–31)	51–59
S. oporaphilum									
35 km N Caranavi, AM, 6 F	63–72	0	13–14	17–19	17–19	44–47	9–10	(41–44)(16–19)(20–21)	17–30
35 km N Caranavi, AM, 3 M	68–70	0	12–15	16–18	18–19	44–46	10	(43–44)(17)(20–21)	23–24
S. tildae									
Río Nareuda, 7 F, 9 M, 1?	68–79	0	13–19	19–21	16–20	49–53	9–11	(47–50)(17–19)(22–23)	22–33
Near Guayaramarin, 2 F	65–74	0	15	—	13–16	47–49	9	(44–49)(17)(21–22)	—
Near Guayaramarin, 1 M	70	0	14	—	14	48	9	48-17-21	—
Uroderma b. bilobatum									
Near Costa Marques, 9 F, 2 M	60–65	0	10–13	15–17	16–18	41–46	7–9	(38–42)(14–16)(20–23)	14–18
U. b. thomasi									
Santa Ana de Madidi, AM and MSB, 8 F, 3 M	64–74	0	11–15	17	16–22	39–45	—	—	10–23
Estancia Cachuela Esperanza, AM and MSB, 4 F, 4 M	68–74	0	11–15	16–19	16–19	43–46	9–10	(39–43)(15–16)(22–23)	14–18
U. magnirostrum									
Baures river mouth, 6 F, 6 M	60–65	0	11–13	14–15	14–17	42–47	8–9	(41–42)(13–15)(21–22)	14–20
Estancia Cachuela Esperanza, 8 F, 1 M	70–75	0	11–14	16–17	15–16	39–46	—	—	16–24
Vampyressa bidens									
Santa Ana de Madidi, AM and MSB, 3 F, 3 M	56–62	0	10–13	—	16–20	34–39	—	—	11–16

TABLE 8
(*Continued*)

	Total Length	Tail Length	Length of Hind Foot	Length of Tibia	Length of Ear	Length of Forearm	Length of Thumb	3rd Finger Formula	Weight (in g)
V. pusilla thyone									
AM 262524, F	53	0	11	11	14	32	6	32-13-16	8
AM 262559, F	50	0	8	10	13	32	6	29-11-14	8
Vampyrodes caraccioli major									
Near Puerto Linares, LSU, 6 M, 1 F	—	—	12–15	19–20	17–19	51–55	10–11	(52–54)(17–22)(27–30)	27–37
Subfamily Desmodontinae									
Desmodus rotundus									
Santa Ana, 3 F, 3 M	79–88	0	16–19	25–27	18–21	55–62	—	—	22–31
Caracato, 13 F, 7 M	78–90	0	17–20	26–29	18–20	59–68	17–20	(57–60)(10–11)(18–20)	35–49
D. youngii									
AM 262644, M	97	0	13	—	17	55	—	—	36
AM 263182, M	90	0	18	—	18	52	—	—	38
AM 260249, M	75	0	18	—	17	—	—	—	29
MSB 55177, M	87	0	16	—	16	—	—	—	30
Beni, AM, 1 F, 3 M	80–85	0	15–19	23	12–15	51–55	9–11	(50–53)(10–12)(26–30)	—
Diphylla ecaudata									
AM 261777, F	88	0	18	24	18	57	—	—	34
Family Thyropteridae									
Thyroptera d. discifera									
Holotype (Wilson, 1978)	70	32	—	15	12	33	—	31-15-10	—
Torres et al. (1988)	—	—	—	—	—	35	—	—	—
AM 94549, F, Brazil	75	30	6	14	—	34	4	33-14-10	—
T. t. tricolor									
AM 67592, M, Ecuador	77	30	4	19	—	37	4	37-15-10	—
AM 264691, F	75	30	4	17	12	34	4	35-15-10	4
Family Vespertilionidae									
Eptesicus andinus									
AM 260257, M	113	50	13	19	14	48	6	44-16-14	10
E. furinalis chapmani									
San Rafael de Amboró, AM, 6 F	96–105	36–41	9	15–17	12–14	40–42	5–6	(37–40)(14–15)(12–13)	10
Near Ing. Mora, MSU, 8 F, 2 M	—	—	—	15	—	38–41	5–6	(35–40)(12–15)(10–12)	—
E. f. montosus									
ANSP 19403, M	100	42	—	—	15	43	—	—	—
ANSP 19494, M	95	40	—	—	16	—	—	—	—
UM 155849, F	114	40	10	15	17	—	6	39-19-11	10
AM 262648, F	—	39	11	16	14	43	6	39-15-13	9
Histiotus montanus laephotis									
MNHN 505, F	107	43	10	?	34	48	12	43-16-22	?
H. velatus									
BM 97.1.25.4, F	—	55+	10	19	26	50	6	42-10-?	
MNLP 435, M	110	53	10	19	28	49	6	45-16-15	9
Lasiurus blossevillii frantzii									
AM 209773, F	93	43	8	19	8	40	7	44-16-17	8
L. cinereus villosissimus									
LSU 22703, F	102	48	11	17	13	—	9	62-18-27	20
MSB 55179, F	134	54	10	—	13	—	—	—	19
AM 260259, F	142	63	12	—	19	—	—	—	22
AM 260258, M	130	57	12	22	16	51	9	56-18-21	17

TABLE 8
(*Continued*)

	Total Length	Tail Length	Length of Hind Foot	Length of Tibia	Length of Ear	Length of Forearm	Length of Thumb	3rd Finger Formula	Weight (in g)
L. e. ega									
San Joaquín, FM, 4 F, 2 M	111–129	45–55	7–12	19	13–18	44–48	6	53-18-16	11–13
MSU 30771, M	—	—	—	19	—	46	7	54-17-17	—
UM 126695, M	120	50	10	17	16	44	7	52-18-17	12
AM 211253, M	115	50	8	—	12	45	6	52-17-17	12
AM 261785, M	120	52	8	19	16	45	6	52-16-17	11
Myotis (*Leuconoe*) *albescens*									
3 M, 2 F	80–91	30–38	8–9	14	11–17	34–36	—	(32–34)(11–12)10	6–8
MSB 56206, F	81´	35	6	12	—	32	—	34-12-10	6
AM 261808, F	81	35	7	11	13	35	4	32-10-9	4
AM 261118, F	89	38	9	—	12	35	—	—	5
M. (*L.*) *levis dinelli*									
Uruguay, AM 205503, sex ?	91	39	11	13	14	38	8	35-11-1	6
AM 39003, M	90	46	9	17?	13	39	8	37-12-11	—
AM 260253, M	91	41	8	—	16	—	—	—	5
AM 261119, M	90	41	10	—	14	39	—	—	5
M. (*L.*) *oxyotus*									
LSU 23160, M	—	—	7	16	12	39	5	36-11-10	4
Peru, AM 60598, F	86	41	6	14	—	38	8	33-11-9	—
M. (*L.*) *riparius*									
AM 260251, M	90	39	8	15	12	35	4	33-10-10.5	6
M. (*L.*) *simus*									
Near San Javier, 35 (M and F)	89–102	36–44	9–11	—	12–14	37–42	—	—	9–11
AM 211156, M	93	39	10	—	12	40	9	36-10-10	10
M. (*Selysius*) *k. keaysi*									
Ecuador, AM 67607, F	92	38	9	16	—	41	8.5	33-13-10	—
LSU 23161, M	—	—	9	17	9	41	6	37-12-9	5
LSU 23162, F	—	—	8	18	9	41	6	37-11-9	6
AM 262647, F	96	48	10	18	14	42	—	—	6
AM 263237, F	84	38	7	15	13	36	5	31-11	6
AM 263238, M	86	41	7	14	12	36	5	33-10-10	5
M. (*S.*) *n. nigricans*									
12 localities	77–88	30–40	6–8	—	9–12	31–35	—	—	4–6
Estación Biológica, 2 F, 3 M	78–87	34–42	6–8	12–14	11–12	32–37	4	(29–31)(10–12)(8–10)	4
AM 209766, M	76	33	6	12	12	34	7	32-10-8	4
Rhogeesa tumida									
FM 115807, M	70	30	6	—	12	—	4	29-12-11	—
Brazil, FM 26465, F	67	26	6	10	12	30	4	26-12-10	—
Family Molossidae									
Eumops a. auripendulus									
MSU 31042, M	—	—	—	18	18	61	10	62-28-25	—
MSU 31039, M	—	—	13	17	—	56	9	60-25-23	—
AM 260305, F	144	51	13	—	25	—	—	—	27
AM 261849, M	147	49	14	—	22	—	—	—	—
Rurrenabaque, 9 M	127–140	42–60	10–15	15–17	21–24	56–60	8–9	(58–63)(24–27)(23–26)	25–34
Rurrenabaque, 12 F	121–142	43–55	10–16	15–18	20–24	56–60	8–9	(58–61)(25–27)(23–24)	26–34
E. bonariensis beckeri									
San Joaquín, FM, 4 F, 4 M	90–103	33–40	10–12	—	6–9	41–47	—	—	12–18
AM 261850, M	109	38	11	—	17	45	6	46-19-17	14
AM 211261, F	110	40	10	14	18	44	6	47-19-18	15

TABLE 8
(*Continued*)

	Total Length	Tail Length	Length of Hind Foot	Length of Tibia	Length of Ear	Length of Forearm	Length of Thumb	3rd Finger Formula	Weight (in g)
E. glaucinus glaucinus									
US 390643, F	147	61	20	—	23	—	—	—	39
US 390644, F	136	53	20	—	25	—	—	—	34
Near Ing. Mora, 2 M, 2 F	—	—	13–14	18–19	23–24	60–63	7–8	(60–64)(24–27)(23–25)	—
MNLP 65, F	133	48	14	—	20	54	—	—	42
EBD, 2 M, 5 F	142–149	52–58	13–14	—	21–24	—	—	—	29–34
E. hansae									
CBF 3342, F	106	41	8.5	—	20	39	—	—	17.3
EBD 14295, F	95	30	9	—	17	38	—	—	16
E. p. perotis									
Totai, 3 F, 2 M	165–183	60–65	14–15	—	36–38	75–88	—	—	—
E. p. trumbulli									
AM 209901, M	150	52	13	20	41	72	8	73-30-27	—
AM 209902, F	146	50	12	—	40	69	7	70-27-23	—
Molossops abrasus									
EBD 13520, F	80	—	—	—	—	49	—	—	37
M. p. planirostris									
AM 260261, M	97	31	7	—	17	—	—	—	10
Near Ingeniero Mora, 7 F, 1 M	—	—	—	9	—	31–33	5	(32–36)(13–19)(10–12)	—
M. t. temminckii									
FM 115814, M	77	25	6	—	10	31	—	—	—
San Joaquín, 2 F, 3 M	69–76	19–25	5–7	—	10–12	29–31	—	—	—
Roboré, AM 260262, F	73	23	8	10	11	31	0	—	6
Roboré, AM 260263, F	68	19	7	10	9.5	29	—	—	5
AM 246652, F	81	21	7	7	7	30	4	32-12-14	7
Molossus molossus crassicaudatus									
Roboré, 12 F, 8 M	95–105	35–41	9–11	13–15	12–17	36–42	—	—	11–16
Puerto Moré, 8 F	105–110	35–40	11–12	12–13	13–14	40–42	5–6	(41–44)(18–19)(16–17)	16–20
M. rufus									
Casarabe, 3 F, 1 M	105–128	40–44	10–14	15	11–17	40–50	7	50-23-19	—
AM 211279, F	120	45	14	—	19	49	7	50-23-19	24
AM 263285, M	133	47	13	13	16	48	7	49-22-19	26
Nyctinomops aurispinosus (Ibáñez and Ochoa, 1988)									
AM 244353, F, Sinaloa	117	45	10	12	20	47	7	48-21-17	13
N. laticaudatus europs									
AM 209774, M	99	40	10	12	17	42	6	41-18-14	11
N. l. laticaudatus									
Roboré, AM and MSB, 13 M	103–116	37–47	9–10	14–16	17–22	45–49	—	—	11–17
AM 246653, M	109	45	10	14	21	46	7	47-19-15	14
N. macrotis									
AM 173661, F, Arizona	140	55	11	—	27	59	6	58-24-21	
AM 264088, M	134	51	12	17	30	59	7	60-24-21	23
Promops centralis occultus									
AM 260273, M	135	56	11	21	17	52	—	—	21
AM 260274, M	125	46	12	17	17	51	—	—	17
MSB 55158, M	137	56	12	19	15	53	—	—	20
P. nasutus ancilla									
AM 260306, F	105	33	16	—	14	—	—	—	16
AM 261851, F	126	50	11	17	15	50	6	51-23-21	15
Tadarida b. brasiliensis									
CM, 1 F, 2 M	95–101	34–36	8–9	12	20	43–44	6	(43–44)(15–16)(14–15)	—
BM 34.9.2.30, F	103	33	7	—	18	42	—	—	—
BM 34.9.2.25, M	101	38	9	—	12	44	—	—	—
BM 34.9.2.26, M	93	32	7	—	15	—	—	—	—

TABLE 9

Cranial Measurements (in mm) of the Chiroptera

	Condylobasal Length	Maxillary Length	Breadth at Canines	Dental Span	Molar Width	Zygomatic Breadth	Lambdoidal Breadth	Breadth of Braincase	Depth of Skull
Family Emballonuridae									
Peropteryx kappleri									
Mean of 5	—	6.32	9.95	—	—	—	—	—	—
P. m. macrotis									
AM 209228, F	15.1	5.6	4.0	7.3	1.8	10.0	8.3	7.6	6.2
AM 209229, M	14.2	6.0	4.3	7.3	1.7	9.8	8.0	7.5	6.2
Rhynchonycteris naso									
Near Costa Marques, 3 F	11.1–11.4	4.0–4.3	3.2–3.4	4.8–5.1	1.0–1.2	7.1–8.3	6.6–6.7	6.0–6.5	5.2–5.6
AM 209201, M	10.8	4.3	3.2	4.6	1.0	7.3	6.5	6.4	5.5
Saccopteryx bilineata									
Versalles, 4 F, 2 M	15.7–15.9	6.3–6.9	4.0–4.2	7.2–7.5	1.9–2.1	10.6–11.4	8.8–9.1	8.2–8.4	7.2–8.0
S. leptura									
AM 210514, F	14.1	5.6	3.5	6.5	1.8	9.9	7.6	7.4	6.2
AM 262418, F	12.6	4.9	2.9	5.5	1.4	8.4	7.2	6.7	5.4
Family Noctilionidae									
Noctilio albiventris affinis									
4 km above Costa Marques, 5 F	18.3–19.3	7.0–7.7	6.5–7.1	9.2–10.0	2.1–2.3	14.7–15.6	14.0–14.3	11.0–11.8	9.1–9.6
4 km above Costa Marques, 4 M	19.6–20.6	7.5–7.7	7.4–7.8	10.1–10.9	2.3–2.5	16.0–16.5	14.2–16.2	11.7–12.1	9.7–11.3
N. leporinus rufescens									
AM 260048, F	24.5	10.4	8.7	12.3	3.3	19.3	17.2	13.8	12.2
AM 261371, F	24.2	10.0	8.5	12.6	3.2	18.2	16.9	13.5	11.1
AM 261372, M	25.3	10.7	9.4	13.2	3.2	20.1	18.7	13.7	12.4
AM 261369, M	24.6	10.5	9.6	12.8	3.2	20.1	18.2	13.5	12.0
Family Mormoopidae									
Pteronotus gymnonotus									
Venezuela, AM 32085, F	16.2	7.3	5.8	6.9	2.0	9.9	9.0	8.3	7.7
P. parnellii rubiginosus									
Venezuela, AM 260001, F	22.1	9.8	6.6	8.5	2.6	13.2	12.2	11.0	10.0
P. personatus personatus									
Venezuela, AM 32128, F	14.0	6.2	4.4	5.6	1.6	8.3	7.7	7.4	6.6
Family Phyllostomidae Subfamily Phyllostominae									
Chrotopterus auritus									
AM 261373, M	30.8	12.6	7.7	11.5	3.2	18.4	15.9	13.1	15.5
AM 209353, M	31.8	13.4	8.1	12.7	4.1	19.4	17.3	14.0	15.7
AM 260867, M	33.6	13.9	8.3	13.0	3.9	20.7	18.9	14.3	16.6
Lonchorhina aurita									
CM 1890, M	18.3	6.7	4.4	7.1	1.9	—	10.6	9.2	8.2
Macrophyllum macrophyllum									
AM 262424, M	14.9	5.6	3.5	6.4	1.7	10.0	9.2	8.1	8.2
Micronycteris daviesi									
CBF 2908, M	24.2	9.8	4.7	9.2	3.1	13.1	10.6	10.6	11.5
M. m. megalotis									
UM 126843, M	15.0	7.2	3.2	5.7	1.4	8.3	7.9	7.1	7.7
M. minuta									
UM 126729, M	16.3	5.9	3.2	5.5	1.4	8.4	8.7	7.4	7.9
M. nicefori									
French Guiana, AM 266019, M	18.5	7.5	3.1	6.0	1.6	9.4	8.9	8.3	7.6
Mimon crenulatum longifolium									
AM 209323, F	19.8	8.2	5.6	8.7	2.4	12.1	12.0	9.0	9.4

TABLE 9
(*Continued*)

	Condylobasal Length	Maxillary Length	Breadth at Canines	Dental Span	Molar Width	Zygomatic Breadth	Lambdoidal Breadth	Breadth of Braincase	Depth of Skull
Phyllostomus d. discolor									
FM 114873, M	27.2	9.6	7.4	10.0	2.1	15.6	15.1	12.2	11.5
FM 114874, M	26.7	9.6	7.4	9.5	2.1	—	14.4	12.0	11.5
FM 114875, M	26.8	9.5	7.5	10.0	2.2	16.0	15.4	12.1	11.7
FM 114876, M	26.8	9.6	6.8	9.9	2.1	15.1	14.4	11.6	10.9
P. elongatus									
AM 210671, M	26.8	10.9	7.9	11.2	2.9	17.1	15.0	11.3	12.8
AM 210672, M	26.5	11.0	7.7	11.3	3.1	17.1	15.0	11.3	11.8
AM 210673, F	26.4	10.8	8.0	11.8	3.2	16.7	14.8	11.5	12.5
AM 210674, F	26.2	10.9	7.2	10.9	3.1	16.4	14.3	11.4	12.0
P. h. hastatus									
FM 50988, M	35.8	14.2	10.4	14.5	3.5	21.2	20.9	14.8	15.8
FM 50989, M	34.8	14.0	9.8	13.6	3.6	21.0	19.8	14.2	15.2
CM 2755, M	33.0	13.4	9.2	13.5	3.4	19.1	18.6	13.8	14.2
FM 21484, F	33.4	13.2	9.2	13.4	3.3	19.7	18.6	13.8	14.3
P. stenops boliviensis									
414, F	28.5	—	—	—	—	15.3	—	13.0	—
P. s. stenops									
AM 205371, F	26.7	10.1	6.2	9.9	2.3	15.0	13.9	12.9	13.4
Tonatia brasiliense									
CBF 179, F	17.6	4.6	3.9	6.4	1.8	9.5	9.2	8.1	8.3
T. carrikeri									
AM 209322, F	20.9	8.2	4.6	7.8	2.1	11.2	11.5	11.1	10.6
T. saurophila maresi									
Peru, AM 76559, F	23.2	9.2	5.4	8.6	2.4	13.7	12.4	10.2	11.2
Trinidad, AM 180261, M	24.3	9.7	5.6	8.8	2.4	14.4	12.9	10.7	12.0
T. s. sylvicola									
FM 114851, M	22.7	9.6	6.1	8.7	2.4	13.4	13.8	10.6	12.2
CM 2761, M	23.6	9.9	6.1	8.9	2.7	13.8	14.1	10.3	12.6
CM 2170, F	22.5	9.2	5.5	8.5	2.4	12.9	12.7	10.4	11.4
BM 23.12.12.2, M	22.5	9.5	5.6	8.6	2.5	12.8	12.9	10.3	11.9
BM 23.12.12.27, sex ?	—	9.2	5.6	8.5	2.4	14.4	12.7	11.0	—
Trachops c. cirrhosus									
AM 209351, F	26.2	10.4	6.3	10.2	3.0	14.7	13.8	11.6	12.2
AM 209349, M	25.4	10.4	6.3	9.9	3.0	14.1	13.1	11.3	11.8
Vampyrum spectrum									
AM 261379, M	43.3	20.5	9.4	14.6	4.7	24.0	18.5	15.9	17.2
Subfamily Lonchophyllinae									
Lonchophylla thomasi									
MSU 32858, F	20.1	—	—	5.9	—	8.7 (inc.)	8.8	8.1	—
AM 210688, F	20.3	6.7	3.7	5.1	0.9	8.7	9.0	8.3	6.8
AM 209358, F	19.5	6.7	3.3	5.4	1.0	8.8	8.6	8.3	6.4
AM 262434, M	19.6	6.4	3.5	5.1	0.8	8.7	8.5	8.4	7.1
AM 262429, M	20.0	6.7	3.7	5.2	0.9	9.1	8.5	8.5	7.1
Subfamily Glossophaginae									
Anoura caudifer									
Vicinity of Caranavi, AM, 2 F, 2 M	21.0–22.5	7.7–8.3	3.9–4.2	5.5–5.6	0.9–1.1	9.4–11.4	9.1–10.0	8.8–9.1	7.2–7.6
A. cultrata									
LSU 22962, F	22.9	8.3	4.6	5.4	0.9	9.8	9.9	9.4	8.0
A. geoffroyi peruana									
AM 244620, F	25.5	9.5	4.4	5.9	1.1	10.5	10.3	9.9	7.6
AM 246473, M	25.4	9.8	4.9	6.1	1.1	11.1	11.0	10.2	7.8
AM 263192, M	24.9	9.3	4.7	6.3	1.0	10.7	10.5	9.8	7.8
AM 263193, M	25.0	9.1	4.5	5.9	1.1	10.4	10.2	9.8	7.8

TABLE 9
(*Continued*)

	Condylobasal Length	Maxillary Length	Breadth at Canines	Dental Span	Molar Width	Zygomatic Breadth	Lambdoidal Breadth	Breadth of Braincase	Depth of Skull
Choeroniscus minor									
AM 262435, M	20.4	7.2	3.6	4.1	0.6	7.6	—	8.5	6.6
Glossophaga s. soricina									
Rurrenabaque, 6 F, 4 M	18.7–19.6	6.7–7.1	3.7–3.8	5.2–5.6	0.9–1.1	9.0–9.4	8.6–8.9	8.4–8.8	6.7–7.6
Lichonycteris obscura									
AM 244621, M	17.9	5.6	3.4	4.5	0.6	8.7	7.3	8.2	6.9
Subfamily Carolliinae									
Carollia brevicauda									
Near Caranavi, AM, 4 F, 6 M	18.7–20.0	5.9–6.7	4.5–4.9	7.4–7.8	1.4–1.7	10.8–11.5	10.3–11.1	9.1–9.7	8.1–8.7
C. castanea									
Rurrenabaque, 6 M	16.9–17.5	5.7–6.0	4.2–4.6	6.8–7.3	1.4–1.6	9.8–10.1	9.9–10.1	8.8–9.3	7.5–8.2
Near Villa Tunari, 7 M, 2 F	16.7–17.7	5.6–6.1	3.9–4.9	6.3–7.5	1.4–1.6	9.3–10.1	9.5–10.6	8.2–9.2	16.4–17.5
C. perspicillata									
Near Casarabe, 5 F, 3 M	20.2–20.7	7.0–7.6	4.4–5.0	7.6–8.2	1.6–1.9	10.9–11.9	10.8–11.4	9.4–9.9	8.2–8.6
Rhinophylla pumilio									
Agua Dulce, 2 F, 3 M	16.5–17.4	4.7–5.3	4.6–4.8	6.4–6.5	0.8–0.9	9.5–9.8	9.0–9.4	8.2–8.7	7.5–8.1
AM 262421, F	16.7	5.1	4.7	6.5	0.9	9.7	9.2	8.3	7.7
AM 262468, F	16.6	4.8	4.6	6.4	0.8	9.8	9.0	8.5	7.9
AM 262469, M	16.5	4.7	4.6	6.5	0.9	9.6	9.2	8.4	7.5
AM 262470, M	17.4	5.2	4.7	6.6	0.9	9.5	9.4	8.7	8.1
Subfamily Stenodermatinae									
Artibeus anderseni									
Beni, 7 M, 3 F	16.4–17.3	5.7–6.1	5.0–5.4	7.6–8.3	1.9–2.1	10.8–11.4	9.6–9.9	8.6–8.9	8.7–9.3
A. g. glaucus									
Near Caranavi, AM, 6 F, 4 M	17.7–18.7	6.2–6.6	5.4–5.8	8.1–8.8	1.9–2.4	11.2–12.3	10.1–10.8	8.8–9.6	7.8–8.4
50 km NW of Villa Tunari, 1 F, 2 M	17.2–17.9	6.0–6.2	5.0–5.6	8.0–8.1	2.0	10.9–11.5	9.9–10.3	8.6–8.9	8.8–9.1
A. glaucus gnomus									
AM 209584, F	16.8	5.5	5.1	7.8	1.8	11.5	10.1	9.3	9.0
A. hartii									
MNLP, FH 181, M	18.8	6.7	5.6	8.7	1.0	12.1	10.8	9.6	9.6
A. jamaicensis fallax									
Near Casarabe, 3 F, 3 M	25.8–27.1	10.1–11.0	8.1–9.0	12.8–13.8	3.5–3.9	17.8–19.2	15.8–17.1	12.8–13.9	10.9–11.9
A. l. lituratus									
Near Guayaramarin, AM, 2 F, 3 M	26.7–27.8	10.1–10.8	8.4–9.0	12.6–13.9	3.3–3.8	18.5–19.4	16.0–17.8	12.7–13.7	11.2–11.8
A. obscurus									
Caranavi and Río Madidi, AM, 4 F, 2 M	24.8–25.6	9.3–10.9	7.8–8.6	11.6–13.8	3.2–4.0	16.6–19.1	14.7–16.7	12.2–13.3	10.2–11.6
Chiroderma s. salvini									
Near Amboró, AM, 2 F, 3 M	24.0–25.2	9.0–9.4	6.2–6.8	11.1–12.9	2.6–3.0	16.2–17.6	12.5–13.3	11.2–12.4	11.3–12.9
LSU 23313, M	25.1	9.5	6.4	12.5	3.1	16.8	13.1	11.4	11.6
LSU 22716, M	23.8	8.8	6.3	11.3	2.6	15.1	11.5	10.3	11.0
C. t. trinitatum									
LSU 22856, F	20.8	7.2	5.1	10.0	2.4	13.7	10.8	9.4	10.0
LSU 23403, F	20.0	6.9	5.2	9.9	2.3	14.1	11.3	9.4	9.7
C. v. villosum									
Near Costa Marques, 5 F, 1 M	22.5–23.7	8.1–8.9	5.7–6.3	11.0–11.7	2.5–2.8	15.4–16.3	12.2–12.7	10.5–11.2	9.1–9.8
Independencia, AM, 2 F, 1 M	21.2–23.0	7.8–8.1	5.8–6.1	10.6–11.1	2.5–2.6	15.2–15.9	11.9–12.5	10.3–10.4	8.8–9.3

TABLE 9
(*Continued*)

	Condylobasal Length	Maxillary Length	Breadth at Canines	Dental Span	Molar Width	Zygomatic Breadth	Lambdoidal Breadth	Breadth of Braincase	Depth of Skull
Mesophylla macconnelli macconnelli									
Independencia, AM, 1 F, 3 M	15.6–16.4	5.4–5.8	3.9–4.2	7.0–7.4	1.4–1.6	10.0–10.5	9.1–9.4	7.8–8.5	7.2–7.9
LSU 22858, F	17.3	6.1	4.3	7.3	1.4	10.0	8.7	7.8	8.2
Platyrrhinus brachycephalus									
Peru, AM 5 F, 1 M	18.1–18.9	6.7–7.1	5.1–5.4	8.6–9.0	1.7–1.9	12.0–12.5	10.4–10.5	9.4–9.7	8.3–8.8
US 564320, F	19.5	7.7	5.6	9.5	1.9	12.8	11.2	9.7	10.24
US 564321, F	19.6	7.3	5.7	9.3	1.8	13.2	11.3	10.3	10.2
P. dorsalis									
Near Caranavi, 5 F	24.3–24.8	9.6–10.1	6.7–7.1	11.7–12.2	2.3–2.6	15.8–16.4	13.4–13.8	11.5–11.7	9.7–10.3
P. helleri incarum									
Estancia Cachuela Esperanza, AM, 5 F, 1 M	18.8–19.6	6.9–7.5	5.0–5.5	8.7–8.9	1.6–1.8	12.2–12.5	10.5–10.8	9.3–9.8	8.2–8.9
P. infuscus									
AM 246621, F	27.9	11.9	7.9	13.6	2.9	18.0	15.2	12.4	10.7
AM 246622, M	28.6	11.8	8.6	14.0	3.0	18.6	15.0	13.1	11.8
AM 246623, F	29.4	12.3	8.4	14.4	2.8	18.8	15.6	12.5	11.3
LSU 22707, sex ?	28.8	12.6	8.3	13.4	2.6	18.3	15.3	12.5	13.1
P. l. lineatus									
Santa Cruz, CM, 3 M	21.9–23.0	8.6–8.8	5.8–6.0	9.6–10.3	1.8–2.1	14.0–15.2	12.4–12.7	10.7–10.9	11.0–11.9
Santiago, 1 F, 3 M	22.0–22.6	8.7–9.2	6.1–6.3	10.2	2.0–2.3	14.1–14.6	11.7–12.6	10.8–11.1	10.3–11.6
P. l. nigellus									
Near Caranavi, 1 F, 3 M, 1 ?	22.1–22.6	8.7–9.0	5.7–6.4	9.9–10.8	2.0–2.2	13.5–14.7	11.6–12.5	10.1–10.8	8.6–10.2
P. vittatus									
Yungas de Totora, 3 F, 2 M	30.4–31.5	—	—	—	—	20.0–20.6	—	13.3–14.0	—
Colombia, AM 15100, F	28.8	12.4	8.45	15.2	3.4	19.7	14.7	13.3	13.9
Pygoderma bilabiatum magna									
Near Amboró, 2 F, 3 M	18.6–19.3	5.7–6.3	6.4–6.8	7.6–8.6	1.9–2.3	13.8–14.7	12.3–12.6	10.3–10.8	8.9–9.5
Near Santa Rosa, 6 F, 2 M	17.6–19.6	5.6–6.6	6.3–7.0	7.5–8.8	1.9–2.3	13.4–14.9	12.1–13.1	10.1–10.7	8.7–9.7
Sphaeronycteris toxophyllum									
AM 209740, F	14.8	4.4	4.7	8.0	2.0	12.3	10.6	9.5	8.2
AM 209741, M	14.4	4.2	4.7	7.6	1.7	12.6	10.4	9.4	8.4
AM 261765, F	14.7	4.6	4.8	8.0	2.0	12.7	10.4	9.3	9.1
AM 262637, M	14.3	4.3	4.7	7.5	1.7	12.6	10.5	9.4	8.5
Sturnira erythromos									
AM 246574, F	18.8	5.6	5.6	7.3	1.7	12.7	11.2	9.7	8.2
AM 246569, M	18.6	5.7	5.4	7.4	1.7	12.4	10.5	9.8	8.6
AM 246571, F	18.8	5.7	5.5	7.7	1.6	13.0	11.0	10.2	8.5
AM 246772, M	19.2	5.7	5.6	7.5	1.6	13.1	11.3	10.0	8.6
S. l. lilium									
Near Cascajal, 3 F, 1 M	20.0–20.7	6.5–6.6	5.7–6.4	7.7–8.6	1.7–1.8	13.1–13.7	11.8–12.2	10.1–10.6	9.0–9.7
Near Villa Tunari, 2 M, 1 F	19.3–20.7	6.2–6.7	5.8–6.3	7.9–8.4	1.6–1.8	13.2–13.8	11.4–12.4	10.3–10.5	8.9–10.0
S. magna									
Near Caranavi, 4 M	25.6–26.4	7.5–7.8	7.8–8.2	9.2–9.4	1.8–1.9	16.0–17.1	14.6–15.1	11.9–12.9	10.6–12.8
S. oporaphilum									
Near Caranavi, AM, 6 F, 3 M and LSU, 1 M	20.3–21.8	6.3–6.8	5.8–6.3	7.5–8.5	1.6–1.8	13.4–14.6	11.3–12.5	10.0–11.0	9.2–10.3
S. tildae									
Río Nareuda, 6 F, 4 M	22.0–23.3	6.6–7.2	6.4–7.3	8.2–9.2	1.5–1.9	14.5–15.6	12.8–13.5	10.8–11.3	9.5–10.7
Near Guayaramarin, 2 F	21.5–22.3	6.6–7.0	—	—	—	—	—	—	7.9–8.2
Uroderma b. bilobatum									
Near Costa Marques, 7 F, 5 M	20.3–21.7	7.3–8.2	5.3–5.8	8.7–9.3	1.9–2.3	12.0–13.2	10.7–11.5	9.4–10.0	8.1–9.0

TABLE 9
(*Continued*)

	Condylobasal Length	Maxillary Length	Breadth at Canines	Dental Span	Molar Width	Zygomatic Breadth	Lambdoidal Breadth	Breadth of Braincase	Depth of Skull
U. b. thomasi									
Estancia Cachuela Esperanza, AM, 6 F, 4 M	20.8–21.9	7.7–8.5	5.6–5.9	9.0–9.8	2.2–2.5	12.8–13.9	10.8–11.6	9.6–10.4	8.5–9.0
Santa Ana de Madidi, AM, 4 F, 3 M	20.6–21.9	7.5–8.4	5.2–5.8	8.9–9.3	2.0–2.3	12.3–13.3	10.8–11.6	9.5–10.2	8.4–9.1
U. magnirostrum									
Baures River mouth, 6 F, 6 M	20.7–22.2	7.7–8.3	5.3–5.7	8.6–9.3	2.0–2.3	12.2–13.3	10.6–11.5	9.3–10.3	7.9–8.9
Vampyressa bidens									
Santa Ana de Madidi, AM, 2 F, 3 M	17.6–18.0	5.9–6.4	4.7–5.0	8.2–8.6	1.8–1.9	11.2–12.2	10.1–10.7	8.9–9.6	7.8–8.2
AM 262517, F	18.1	6.3	4.7	8.5	1.8	11.8	10.2	9.2	7.8
V. pusilla thyone									
AM 262524, F	16.3	5.6	4.4	7.3	1.6	10.8	—	8.3	8.8
AM 262559, F	15.6	5.3	4.3	7.3	1.5	10.5	—	8.3	8.2
Vampyrodes caraccioli major									
AM 209518, F	23.6	9.0	6.9	12.0	3.0	17.0	13.0	11.3	9.8
LSU 23361, sex ?	24.0	9.0	6.3	11.7	2.8	16.7	13.7	11.7	11.7
LSU 23419, sex ?	25.2	9.7	7.3	12.3	2.8	17.6	14.0	10.8	11.8
			Subfamily Desmodontinae						
Desmodus rotundus									
Caracato, AM, 8 F, 4 M	21.6–22.7	2.9–3.6	6.0–6.5	6.2–7.6	0.8–1.4	12.2–12.9	12.4–13.4	12.1–12.8	10.7–11.8
D. youngii									
Near Horquilla, 3 M	21.5–22.1	2.9–3.0	6.1–6.4	6.3–6.7	0.7–0.8	13.9–14.2	12.6–12.9	13.0–13.6	10.6–11.3
AM 209742, F	22.0	2.7	6.4	6.8	0.7	14.0	13.1	12.9	10.5
AM 260249, F	20.9	3.2	6.0	6.4	0.8	13.5	12.2	12.9	11.1
Diphylla ecaudata									
AM 261777, F	20.1	3.6	5.7	6.0	0.5	12.9	12.4	11.4	9.9
			Family Thyropteridae						
Thyroptera d. discifera									
Brazil, AM 94549, F	13.4	5.6	2.9	5.2	1.3	7.1	—	7.0	6.3
T. t. tricolor									
Ecuador, AM 67592, M	13.3	5.6	2.9	5.4	1.4	7.4	—	7.4	6.6
AM 264691, F	13.8	5.8	3.0	5.1	1.4	7.5	7.1	7.3	6.8
			Family Vespertilionidae						
Eptesicus andinus									
AM 260257, M	17.2	6.6	5.4	7.5	2.0	11.9	9.1	8.0	7.0
E. furinalis chapmani									
BM 16.12.4.21, F	15.0	4.0	4.9	6.9	2.0	11.0	8.6	7.8	5.8
San Rafael de Amboró, 5 F	15.3–15.7	5.8–6.1	4.8–5.2	6.7–7.2	1.8–1.9	10.8–11.7	8.4–9.0	7.4–7.9	5.6–6.5
E. f. montosus									
AM 262648, F	15.6	5.9	4.8	6.8	1.8	10.7	8.8	7.5	6.2
Histiotus montanus laephotis									
MNLP 505, F	16.7	5.9	4.4	6.9	1.8	10.7	9.0	7.9	6.5
BM 45.11.18.1, sex ?	16.3	6.3	4.6	6.7	1.8	10.1	8.8	8.1	6.1
BM 34.9.2.20, F	—	6.5	4.8	7.0	1.8	—	—	—	—
H. velatus									
MNLP 435, M	16.4	5.8	4.8	6.3	1.6	9.8	8.6	7.9	6.3
Lasiurus blossevillii frantzii									
BM 34.9.2.19, M	11.5	3.9	—	—	1.2	7.6	6.9	—	—
AM 209773, F	11.3	4.1	4.5	5.4	1.2	8.9	7.4	7.1	6.0

TABLE 9
(Continued)

	Condylo-basal Length	Maxillary Length	Breadth at Canines	Dental Span	Molar Width	Zygomatic Breadth	Lamb-doidal Breadth	Breadth of Braincase	Depth of Skull
L. cinereus villosissimus									
AM 260259, F	15.8	5.8	6.8	8.2	1.9	12.2	9.8	9.0	7.1
AM 260258, M	15.2	5.4	6.2	7.4	1.8	11.4	9.6	8.8	7.4
LSU 22703, F	14.9	5.1	6.5	7.7	1.9	11.4	9.7	8.6	6.9
L. e. ega									
AM 211253, M	15.6	5.6	6.1	7.5	1.8	10.9	8.8	8.6	7.0
AM 261785, M	15.6	5.6	5.9	7.3	1.7	11.0	8.9	8.5	7.4
Myotis (Leuconoe) albescens									
3 M, 2 F	12.7–13.7	4.9–5.2	3.5–3.7	5.1–5.7	1.2–1.3	8.4–8.8	7.1–7.3	7.1–7.5	5.4–5.9
AM 261118, F	12.8	5.0	3.8	5.6	1.3	8.7	7.2	6.6	5.1
M. (L.) levis dinelli									
Uruguay, AM 205503	14.5	5.7	3.7	5.9	1.5	9.7	7.7	7.2	5.5
Bolivia, AM 248202	13.5	5.5	3.4	5.6	1.5	8.5	6.8	6.8	5.0
Bolivia, AM 39003	—	5.4	—	—	1.5	—	7.2	7.0	—
M. (L.) oxyotus oxyotus									
LSU 23160, M	12.9	5.1	3.2	5.1	1.3	8.3	6.9	6.9	5.1
M. (L.) riparius									
Peru, AM 230775, F	13.6	5.4	3.8	5.8	1.5	9.1	7.2	6.6	5.6
AM 260251, M	13.4	5.2	3.8	5.7	1.5	9.3	7.8	6.8	5.3
M. (L.) simus									
AM 211156, M	14.4	5.5	4.2	6.1	1.5	10.0	8.0	7.5	6.0
M. (Selysius) k. keaysi									
Ecuador, AM 67607, F	13.2	5.5	3.5	5.5	1.5	8.3	6.9	6.7	5.6
AM 263237, F	12.6	5.0	3.6	5.4	1.3	—	6.9	6.2	5.0
AM 263238, M	13.0	5.2	3.6	5.4	1.5	8.6	7.2	6.6	5.3
AM 262647, F	14.0	5.5	3.8	5.7	1.5	8.8	7.6	7.1	5.4
LSU 23162, F	13.0	5.2	3.5	5.0	1.3	8.5	7.6	6.6	—
M. (S.) n. nigricans									
AM 211200, F	13.2	5.1	3.3	5.6	1.3	8.3	7.2	6.9	5.1
AM 211201, F	13.0	5.0	3.6	5.4	1.4	8.2	7.2	6.8	4.9
AM 209766, M	12.3	4.7	3.5	5.2	1.2	8.3	6.9	6.9	5.2
Rhogeesa tumida									
FM 115807, M	11.9	4.4	3.5	5.3	1.3	7.6	6.7	6.0	5.0
Family Molossidae									
Eumops a. auripendulus									
Rurrenabaque, 5 F	22.5–23.1	8.9–9.3	5.8–6.4	9.8–10.4	2.6–3.0	14.1–14.4	8.5–9.2	10.8–11.1	8.4–9.3
Rurrenabaque, 5 M	22.8–23.5	8.8–9.3	6.1–6.9	9.9–10.4	2.7–3.0	14.6–14.7	8.6–9.8	10.8–11.1	8.6–9.1
E. bonariensis beckeri									
AM 261850, M	17.3	6.8	4.6	8.0	2.2	11.4	7.6	9.0	7.0
AM 211261, F	16.3	6.8	4.0	7.6	2.1	10.7	7.0	8.9	7.0
E. p. perotis									
Totai, 5 M	30.8–31.4	11.8–12.4	8.2–8.7	12.7–13.2	3.4–3.8	18.0–18.8	14.8–15.5	12.6–13.5	10.5–11.0
Totai, 5 F	29.5–31.1	11.7–12.0	7.6–8.1	12.2–12.8	3.3–3.7	17.3–18.2	14.8–15.1	12.4–13.4	10.2–10.5
E. p. trumbulli									
AM 209901, M	28.0	10.9	7.1	11.3	2.9	17.1	11.4	12.6	10.4
AM 209902, F	26.6	10.4	6.8	10.9	3.1	16.1	10.8	11.8	10.3
Molossops abrasus									
Ibáñez (1985), EBD 13520, F	20.9	8.6 ?	—	—	—	—	15.3	—	—
M. planirostris planirostris									
AM 260261, M	15.9	6.0	4.7	7.5	1.9	10.8	—	8.0	5.7
M. temminckii temminckii									
AM 211254, F	13.3	5.1	3.8	6.4	1.6	9.1	—	7.3	4.8
AM 263286, F	13.1	5.0	3.6	6.6	1.7	8.9	8.2	7.0	4.8

TABLE 9
(Continued)

	Condylo-basal Length	Maxillary Length	Breadth at Canines	Dental Span	Molar Width	Zygomatic Breadth	Lamb-doidal Breadth	Breadth of Braincase	Depth of Skull
Molossus molossus crassicaudatus									
Puerto Moré, 5 F	15.4–16.4	5.8–6.3	4.2–4.6	7.4–8.2	2.0–2.2	10.8–11.5	7.8–8.3	8.8–9.5	7.5–7.9
Puerto Moré, 5 M	16.4–17.0	6.0–6.4	4.6–4.9	8.0–8.3	2.1–2.3	11.3–11.9	8.6–9.2	9.2–9.5	8.2–8.6
M. rufus									
AM 211279, F	19.6	7.6	5.4	10.0	2.8	13.2	9.4	9.9	9.6
AM 263285, M	20.2	7.9	6.0	9.9	2.8	13.8	9.9	10.7	10.2
Nyctinomops aurispinosus									
Sinaloa, AM 244353, F	17.6	7.2	4.7	8.2	2.4	11.2	10.5	9.2	7.0
N. laticaudatus europs									
AM 209774, M	15.6	6.3	4.0	7.2	2.1	9.6	6.0	8.4	6.5
N. l. laticaudatus									
Roboré, AM, 5 M	17.0–17.3	6.5–6.7	4.0–4.2	7.5–7.7	2.0–2.2	10.2–10.4	10.1–10.2	8.6–9.0	6.4–6.9
N. macrotis									
Arizona, AM 173661, F	21.5	8.8	5.2	9.1	2.7	12.2	11.6	10.6	8.7
AM 264088, M	21.9	8.4	5.1	8.6	2.1	12.4	11.5	10.2	7.6
Promops centralis occultus									
AM 260273, M	18.3	7.0	4.9	9.1	2.2	12.4	11.6	9.6	9.1
AM 260274, M	18.5	7.1	4.8	8.8	2.2	12.4	11.9	9.9	8.7
P. nasutus ancilla									
AM 260306, F	16.4	6.2	4.2	8.0	2.0	10.7	10.5	8.7	8.0
AM 261851, F	17.2	6.7	4.7	8.6	2.3	11.3	11.0	9.1	8.5
Tadarida b. brasiliensis									
CM 5278, M	16.0	6.1	4.4	7.2	1.9	10.2	9.4	8.3	6.3
CM 5279, F	—	6.1	4.0	7.2	1.9	9.4	—	—	—
BM 34.9.2.30, F	15.2	5.7	4.0	6.9	1.7	9.7	9.1	8.2	6.2
BM 34.9.2.25, M	15.7	6.1	4.3	7.2	1.9	10.0	9.3	8.0	6.0
BM 34.9.2.26, M	15.0	5.6	4.2	7.4	1.8	10.4	9.3	8.4	6.2

TABLE 10
External Measurements (in mm) of the Primates

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)
		Family Callitrichidae Subfamily Callimiconinae			
Callimico goeldii					
AM 248726, M	555	320	81	25	490
AM 248727, M	550	315	83	25	520
		Subfamily Callitrichinae			
Callithrix melanura					
Río Quiser, 1 M, 5 F	525–580	305–340	62–64	26–28	—
Río Mapaiso, CM, 3 M	558–582	328–335	65–70	32	—
Ibiato, F	535	310	65	30	330
Cebuella pygmaeus					
Ecuador, AM 182942, M	340	188	37	8	—
Saguinus fuscicollis weddellii					
US 238258, sex ?	540	319	69	—	—

TABLE 10
(*Continued*)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)
S. imperator imperator					
Hershkovitz (1977, App. 2) (Brazil and Peru)	595–670	350–415	68–72	28	—
S. labiatus labiatus (no Bolivian data)					
Brazil, AM 20361	750	430	72	24	—
Family Cebidae Subfamily Alouattinae					
Alouatta caraya					
Puerto Caballo, AM, 4 F	960–1045	520–580	125–137	40	3500–4700
Puerto Caballo, AM, 4 M	982–1265	515–645	134–158	43–47	3800–9500
A. seniculus sara					
ANSP 19428, M	1300	588	142	42	—
AM 38808, F	1150	600	140	40	—
AM 38809, F	1090	550	130	38	—
Subfamily Aotinae					
Aotus azarai boliviensis					
AM 211470, F	765	435	101	35	1262
AM 211473, F	748	419	104	37	1147
AM, 3 M	683–776	413–440	99–102	34–35	758–1284
Ibiato, 3 M, 6 F	690–810	360–449	86–111	32–41	1000–1400
AM 246657, M	731	401	92	34	1000
AM 246658, F	706	398	93	36	900
A. nigriceps (no Bolivian data)					
Subfamily Atelinae					
Ateles chamek					
Santa Cruz Dept., 5 F	1150–1350	720–830	200–220	25–35	—
Subfamily Callicebinae					
Callicebus d. donacophilus					
AM, 2 F	690, 725	400, 396	87, 92	36, 35	680–910
AM, 3 M	625–715	365–410	86–92	35–36	455–910
C. modestus					
Stockholm 135, M	715	400	90	—	—
C. olallae					
Stockholm 187, M	750	340	100	—	—
Subfamily Cebinae					
Cebus albifrons cuscinus (no Bolivian data)					
C. a. unicolor					
AM, 3 F	730–749	365–392	107–110	32–35	2000–2200
AM, 5 M	763–830	383–435	110–131	36–42	2600–3500
C. apella pallidus					
AM 211578, M	835	425	125	39	3900
AM 211579, M	832	420	123	44	4100
AM 209926, F	680	350	108	34	1800
ANSP 19445, F	765	376	114	46	—

TABLE 10
(*Continued*)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)
C. a. paraguayanus					
AM 260864, F	807	421	113	37	2600
ANSP 19182, F	787	405	118	38	—
ANSP 19183, M	788	367	118	35	—
Saimiri sciureus boliviensis					
Mamoré R., AM, 6 F	597–711	366–436	76–84	25–28	479–816
Mamoré R., AM, 7 M	605–684	365–405	79–85	27–30	480–938
		Subfamily Pitheciinae			
Pithecia i. irrorata					
AM 248723, M	930	505	141	36	—

TABLE 11
Cranial Measurements (in mm) of the Primates

	Length of Skull I	Length of Skull II	Zygomatic Breadth	Length of Molariform Row	Dental Span	Length of Mandible	Depth of Mandible I	Depth of Mandible II
				Family Callitrichidae Subfamily Callimiconinae				
Callimico goeldii								
AM 248727, M	47	52	34.8	12.0	19.1	32.3	16.3	22.0
				Subfamily Callitrichinae				
Callithrix melanura								
FM 44859, F	40.2	46.1	27.9	8.7	14.2	30.0	14.1	15.2
CM 5011, F	40.2	45.5	29.8	8.1	14.7	29.6	14.0	17.4
Río Mapaiso, 3 M	40.1–41.5	45.5–47.7	30.5–30.7	8.6–9.1	14.9–15.8	29.6–31.2	13.7–15.0	17.6–18.2
Cebuella pygmaea								
AM 75280, M	30.6	34.4	23.0	6.7	10.7	20.8	9.8	7.6
Saguinus fuscicollis weddellii								
US 238261, sex ?	40.1	44.9	28.4	8.4	15.4	28.5	11.2	15.8
US 238258, sex ?	41.1	46.5	29.0	8.2	15.3	29.8	11.8	15.7
S. imperator imperator (no Bolivian data)								
Peru, AM 76013, F	41.2	45.3	29.4	8.5	15.5	29.8	12.4	16.4
				Family Cebidae Subfamily Alouattinae				
Alouatta caraya								
Exaltación, 4 F	73.9–77.9	104.1–105.9	66.7–70.0	30.1–31.9	36.5–37.7	79.0–79.5	45.4–50.7	47.9–55.8
Exaltación, 1 M	95.9	135.5	87.0	37.0	44.6	102.6	66.5	71.3
Puerto Caballo, 1 M	89.4	127.0	87.1	35.2	41.8	98.9	63.0	66.4
Puerto Caballo, 2 F	70.9, 71.4	107.3, 102	69.6, 63.6	32.1, 31.2	36.6, 34.8	82.1, 74.9	51.2, 42.1	54.5, 43.2
A. seniculus sara								
ANSP 19428, M	89.2	129.3	84.3	34.1	41.0	104.7	69.6	73.1
ANSP 19429, F	82.6	114.7	66.7	33.0	37.0	84.6	47.2	50.0

TABLE 11
(*Continued*)

	Length of Skull I	Length of Skull II	Zygomatic Breadth	Length of Molariform Row	Dental Span	Length of Mandible	Depth of Mandible I	Depth of Mandible II
Subfamily Aotinae								
Aotus azarai boliviensis								
AM 211466, F	55.4	66.2	41.6	14.3	20.8	41.6	24.8	30.4
AM 211470, F	51.3	63.2	41.7	19.0	24.4	46.8	29.4	36.0
AM 211469, M	51.4	63.5	40.1	14.1	20.6	42.7	25.1	30.2
AM 211472, M	52.8	62.5	39.5	13.9	20.5	42.9	25.4	30.7
AM 246657, M	50.0	60.5	38.1	14.2	19.6	36.7	22.0	26.0
AM 246658, F	51.2	61.5	37.2	14.3	20.1	—	22.7	28.4
Subfamily Atelinae								
Ateles chamek								
Santa Cruz Dept., 5 F	87.4–93.6	113.9–120.6	63.5–71.4	22.9–24.6	29.6–34.3	71.3–81.4	35.6–41.2	42.7–50.9
FM 21386, M	89.4	118.1	69.4	27.4	31.2	76.1	42.1	49.5
Subfamily Callicebinae								
Callicebus d. donacophilus								
Buenavista, 2 F	48.9–49.2	58.6–59.2	38.1–39.1	14.5–14.6	18.7–19.0	38.1–39.7	25.3–27.1	31.3–32.1
Buenavista, 4 M	49.8–51.2	59.9–60.8	37.0–40.2	13.9–15.5	18.7–19.7	39.4–40.8	27.4–28.5	32.9–35.2
10 km E of San Antonio, 3 M	47.9–50	56.3–58.8	32.9–39.1	13.8–14.8	17.2–19.9	35.3–40.4	21.7–29.4	25.6–35.9
10 km E of San Antonio, 2 F	47.2, 50.3	56.4, 58.7	34.2, 36.1	13.5, 14.0	17.6, 18.8	36.2, 39.2	25.5, 28.5	31.2, 34.2
C. modestus								
Lönnberg (1939: 17)	—	—	39	15	19.4	—	—	—
Subfamily Cebinae								
Cebus albifrons unicolor								
AM 211550, F	66.9	84.3	55.7	20.2	25.8	56.4	25.1	32.8
AM 211553, M	72.2	87.8	64.3	19.1	28.1	58.9	27.4	36.5
AM 211556, M	77.9	96.7	68.9	20.7	29.0	63.6	33.9	44.8
AM 211557, F	69.9	85.7	57.6	19.1	27.1	57.6	27.0	36.8
C. apella pallidus								
AM 211578, M	77.3	98.1	74.5	23.0	30.5	68.6	33.7	45.9
AM 211579, M	74.7	95.1	69.3	20.3	28.9	64.3	35.9	45.0
AM 209926, F	67.0	84.1	54.2	19.6	27.9	54.4	26.1	33.8
ANSP 19445, F	73.6	90.6	60.6	22.4	29.1	57.9	27.5	34.5
Buenavista, 2 F	73.5–73.7	91.0–91.4	60.8–61.4	21.1–29.5	23.2–30.2	60.8–61.4	29.9–29.6	39.0
Buenavista, 8 M	73.3–81.4	90.5–101.6	62.9–74.0	21.8–24.6	29.3–32.3	59.0–71.5	30.0–39.5	32.3–52.1
C. a. paraguayanus								
ANSP 19182, F	74.7	92.8	63.4	21.5	30.6	51.6	30.5	39.7
ANSP 19183, M	72.9	92.8	67.2	21.7	30.6	64.3	31.4	40.7
Saimiri sciureus boliviensis								
Mamoré R., AM, 4 F	49.9 ± 0.1 48.2–50.1	57.5 ± 0.3 57.2–57.8	33.6 ± 2.4 31.5–36.7	11.2 ± 0.2 11.1–11.5	17.2 ± 0.2 16.5–17.8	31.6 ± 2.4 29.1–34.2	12.3 ± 0.8 11.7–13.3	15.7 ± 1.0 14.7–16.8
Mamoré R., AM, 4 M	50.9 ± 0.9 49.8–52.0	60.5 ± 1.6 58.8–62.3	39.2 ± 3.0 34.7–41.4	11.7 ± 0.2 11.5–11.8	18.1 ± 0.3 17.8–18.5	35.3 ± 1.7 33.3–37.4	14.8 ± 1.7 12.5–16.5	18.9 ± 1.7 16.7–20.5
Subfamily Pitheciinae								
Pithecia i. irrorata								
AM 248723, M	64.4	88.1	54.9	18.3	23.8	59.1	47.8	39.4

TABLE 12
External Measurements (in mm) of the Carnivora

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in kg)
		Family Canidae			
Atelocynus microtis					
BM 26.1.5.5, M	920	270	120	70	—
Cerdocyon thous entrerianus					
Carapari, BM, 3 M	882–1004	262–334	132–141	64–68	—
Carapari, BM, 5 F	880–960	260–362	123–136	61–67	—
Chrysocyon brachyurus					
Brazil, AM 133940, F	1500	420	300	165	25
Pseudalopex culpaeus andina					
AM 262663, sex ?	1110	390	173	104	8.7
BM 26.6.12.1, M	975	335	97	—	—
P. g. gymnocercus					
FM 51869, F	1030	330	130	70	—
Speothos v. venaticus					
BM 02.1.1.8, M yg.	600	140	115	45	—
BM 02.1.1.10, F yg.	620	145	115	45	—
Peru, AM 98559, F	600	110	200	50	—
MACN 50.67, M ad.	810	110	110	45	—
		Family Felidae			
Felis (*Felis*) *catus*					
Brazil, AM 96295, M	790	294	126	—	—
F. (*Herpailurus*) *yaguarondi eyra*					
ANSP 14254, F	1025	395	124	37	—
FM 51861, F	990	400	125	32	—
F. (*Leopardus*) *pardalis steinbachi*					
LACM 62852, F	1028	311	144	65	8.18
AM 248728, F	1035	338	158	58	9.6
MNLP 528, M	1120	365	155	60	12.2
Ibiato, 2 M	1215, 1160	375, 387	165, 155	63, 64	14.5, 12.5
F. (*L.*) *tigrina* (no Bolivian specimen)					
Peru, FM 78404, M	760	270	110	—	2.045
Peru, FM 79923, M	790	295	110	—	2.045
F. (*L.*) *wiedii boliviae*					
BM 26.1.5.4, M	1380	500	100	45	—
AM 61788, M	990	360	92	40	—
FM 34341, M	1100	400	120	42	—
Ibiato, 2 F	930, 980	380, 420	120, 129	53, 53	3.5, 4.0
F. (*Lynchailurus*) *pajeros garleppi*					
BM 34.9.2.31, F	1035	285	115	55	—
F. (*Oncifelis*) *geoffroyi euxantha*					
AM 39010, M	840	340	110	55	—
AM 39004, M	820	330	105	52	—
F. (*Oreailurus*) *jacobita*					
Peru, MVZ 116317, M	990	413	133	63	4.0
F. (*Puma*) *concolor* (no Bolivian data)					
Estimates only	1100	600	245	—	60
Panthera onca palustris					
FM 34344, M	2055	610	—	—	—

TABLE 12
(*Continued*)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in kg)
Family Mustelidae Subfamily Lutrinae					
Lutra longicaudis enudris					
AM 209133, sex ?, F yg.	555	218	79	17	0.788
Pteronura brasiliensis paranensis					
Estimates	2200	700	128	—	34
Subfamily Mephitinae					
Conepatus chinga rex					
AM 39011, M	540	280	70	23	—
AM 260327, M	558	235	63	28	1.1
MSB 56102, M	540	220	58	26	1.35
Subfamily Mustelinae					
Eira barbara peruana					
AM 40838, M	1067	371	118	—	—
AM 38810, M	1070	395	120	50	—
AM 246962, F	1045	401	122	41	5.0
AM 246963, F	967	386	108	37	3.65
Galictis cuja luteola					
AM 38983, F	535	272	55	22	—
FM 51882, F	525	175	50	—	—
G. vittata andina					
CM 2188, M	760	160	83	27	—
MACN 50.91, F	640	160	70	25	—
Mustela frenata boliviensis					
AM 72587, M	383	140	43	—	—
AM 268672, F	328	120	40	19	81
Family Procyonidae Subfamily Potosinae					
Bassaricyon alleni					
MACN 50.82, M	870	470	70	30	—
MNLP (KHR 43), F	850	451	83	41	1.2
CBF 2950, M	800	425	76	36	1.5
Potos flavus chapadensis					
AM 94249, F	875	475	85	40	—
MSB 57231, M	914	492	98	38	2.1
UM 122619, M	961	518	100	40	—
Ibiato, F	880	440	85	45	1.6
Subfamily Procyoninae					
Nasua nasua boliviensis					
AM 38803, M	1310	540	100	42	—
AM 246973, F	932	394	89	38	3.25
AM 38801, F	640	270	75	25	—
CM 5267, M	950	365	85	45	—
N. n. dorsalis					
AM 255871, M	980	445	95	42	—
AM 214717, F	775	371	87	41	2.0
AM 209129, M	810	380	92	42	2.5

TABLE 12
(*Continued*)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in kg)
Ibiato, 20 F	950.6 ± 37.9	447.4 ± 19.0	88.8 ± 5.7	38.6 ± 5.1	3.87 ± 0.25
	830–1000	415–495	75–100	21–45	3.5–4.5
Ibiato, 27 M	1010.6 ± 35.1	469.3 ± 29.0	97.9 ± 3.8	41.9 ± 3.9	5.0 ± 0.61
	950–1070	423–450	90–105	32–47	4.0–6.5
Procyon c. cancrivorus					
AM 94246, M	930	320	135	50	—
AM 94247, F	1010	320	160	45	—
		Family Ursidae			
Tremarctos ornatus					
Male, estimates	1400	70	250	80	130
Female, estimates	1200	60	210	69	60

TABLE 13
Cranial Measurements (in mm) of the Carnivora

	Condylobasal Length	Postdental Breadth	Transdental Breadth	Length of P4	Zygomatic Breadth	Gap at Temporal Ridges	Interorbital Breadth	Postorbital Breadth
			Family Canidae					
Atelocynus microtis								
BM 26.1.5.5, M	154.2	16.1	44.4	14.9	93.2	—	34.4	25.7
Cerdocyon thous entrerianus								
AM 209122, M	150.3	16.3	39.2	14.4	83.4	12.5	30.2	36.0
AM 209123, M	139.6	16.2	39.2	13.1	77.9	12.0	27.4	31.6
AM 209124, F	142.0	15.4	38.4	13.2	78.8	7.6	24.5	30.1
Chrysocyon brachyurus								
FM 96003, M	211.0	20.9	58.3	20.2	103.1	7.5	40.7	41.5
Pseudalopex culpaeus andina								
AM 73099, sex ?	118.6	14.0	—	—	63.0	8.8	21.2	22.6
AM 244656, F	—	14.0	43.2	15.2	—	9.1	27.7	26.6
BM 26.6.12.1, M	149.7	15.8	43.3	16.6	82.7	—	26.8	24.6
P. g. gymnocercus								
FM 51869, F	138.2	13.7	40.8	13.7	78.5	7.5	26.6	21.6
Laguna Palmar, AM, 7	121–136	11.4–13.3	37.0–42.1	12.1–14.8	67–79	6.0–9.1	21.6–28.2	24.7–26.7
Speothos v. venaticus								
AM 98559, F	125.8	13.1	43.1	13.9	73.9	9	26.3	24.0
MACN 50.67, M ad.	140.0	14.5	45.3	12.9	78.0	0	29.4	24.2
			Family Felidae					
Felis (*Felis*) *catus*								
Brazil, AM 96295, M	84.8	11.9	35.9	10.0	64.3	4	18.0	26.9
F. (*Herpailurus*) *yaguarondi eyra*								
AM 215137, M	114.0	13.4	38.5	13.0	70.0	13.6	18.9	30.6
AM 214741, M	101.7	13.1	36.7	11.6	60.8	10.1	18.0	33.2
Buenavista, BM, 4 F, 3 M	89.1–100.7	11.9–14.3	35.8–39.4	11.3–12.2	57.0–67.4	19–30	16.0–19.6	28.0–32.3

TABLE 13
(*Continued*)

	Condylobasal Length	Postdental Breadth	Transdental Breadth	Length of P4	Zygomatic Breadth	Gap at Temporal Ridges	Interorbital Breadth	Postorbital Breadth
F. (*Leopardus*) *pardalis steinbachi*								
LACM 62852, F	122	14.5	48.6	—	83.7	—	23.3	—
UM 126851, M	119.5	14.7	45.7	14.6	85.2	5.9	24.4	32.0
F. (*L.*) *tigrina*								
Peru, FM 78404, M	81.4	8.9	31.4	9.8	54.8	23.0	15.2	27.0
Peru, FM 79923, M	82.1	8.9	31.6	9.4	57.4	25.3	16.9	27.9
F. (*L.*) *wiedii boliviae*								
BM 26.1.5.4, M	96.6	11.1	37.3	11.4	74.1	—	21.5	35.0
BM 26.1.12.5, M	93.0	10.4	35.9	10.8	68.8	—	17.8	34.8
F. (*Lynchailurus*) *pajeros garleppi*								
BM 34.9.2.31, F	87.9	12.7	39.1	11.0	68.4	12.8	18.5	29.4
F. (*Oncifelis*) *geoffroyi euxantha*								
AM 39010, M	94.2	11.0	35.2	11.0	64.8	10.2	17.9	28.3
AM 39004, M	89.7	10.6	31.6	10.7	57.9	21.1	16.3	29.6
BM 34.9.2.37, M, holotype	92.7	10.1	35.3	11.0	66.7	10.2	17.8	26.1
F. (*Oreailurus*) *jacobita*								
Peru, MVZ 116317, M	96.0	14.1	33.0	14.0	69.5	15.8	20.5	29.0
F. (*Puma*) *concolor osgoodi*								
AM 214740, sex ?	168.8	25.1	68.8	21.8	99.6	4.7	33.7	40.0
AM 247713, sex ?	199.1	29.1	69.3	21.0	132.0	7.8	37.9	46.0
MSU 28254, sex ?	151.8	26.9	69.1	21.7	116.4	?	31.5	43.6
Panthera onca palustris								
UM 54974, sex ?	—	27.9	83.9	26.9	158.6	—	42.7	41.7
LACM 51569, F	188.0	25.6	82.5	28.1	138.2	12.0	36.2	47.2
FM 34344, M, holotype of *boliviensis*	234.7	30.3	90.4	28.8	176.9	0	46.8	42.9
P. onca peruviana								
AM 209136, M	229	35.1	94	29.2	179	0	51.7	47.4
AM 209135, M	198	25.9	81.4	27.0	143.5	0	38.9	39.9
			Family Mustelidae Subfamily Lutrinae					
Lutra longicaudis enudris								
CM 4929, F	106.3	13.3	37.0	13.0	67.1	—	20.4	16.8
CM 4955, M	106.3	13.6	35.7	13.2	68.3	—	19.8	13.9
Pteronura brasiliensis paranensis								
Ecuador, AM 71858, F	151.1	16.2	51.2	16.9	92.9	—	15.1	14.3
Probably Bolivia, MNK	156	15.9	—	—	93.3	0	15.1	15.4
Bolivia, MACN 33.155	152.8	16.2	52.8	19.1	97.1	0	17.7	16.2
			Subfamily Mephitinae					
Conepatus chinga rex								
AM 39011, M	68.7	10.4	24.1	5.6	41.9	6.2	20.0	19.6
AM 247712, sex ?	—	—	—	8.0	—	12.0?	19.9	23.7
Choro, BM, 3 F	69.7–71.1	9.4–11.6	26.4–28.0	6.2–7.4	43.2–47.1	1.7–3.6	21.8–22.6	17.8–20.3
BM 98.3.16.4, F	73.6	11.4	27.7	6.6	44.6	4.4	22.3	19.5
BM 2.1.1.15, M	68.5	10.9	27.6	7.1	43.2	0	20.5	17.6
BM 2.1.1.11, M	75.7	12.6	29.6	7.1	49.0	0	23.5	20.1

TABLE 13
(*Continued*)

	Condylo-basal Length	Post-dental Breadth	Trans-dental Breadth	Length of P4	Zygo-matic Breadth	Gap at Temporal Ridges	Inter-orbital Breadth	Post-orbital Breadth
Subfamily Mustelinae								
Eira b. barbara								
AM 214735–214737, AM 215134–215136 (*n* = 6)	91.0–114.5	11.4–14.4	20.0–32.7	8.0–9.4	58.6–67.4	6.4–24.3	20.0–26.1	22.4–27.6
E. b. peruana								
AM 40838, M	113.5	15.0	34.9	9.8	72.0	3.7	27.7	26.5
AM 246962, F	111	13.9	34.6	9.9	70	—	24.3	22.1
AM 246963, F	109	14.9	32.8	8.4	68	—	26.2	22.1
Galictis cuja luteola								
FM 51882, F	67.3	7.3	21.7	7.2	37.9	5.5	14.7	16.7
BM 34.9.2.54, M	78.5	9.3	24.6	7.9	43.6	—	17.2	18.6
G. vittata andina								
CM 2188, M	93.3	11.1	30.7	9.7	54.0	—	23.0	20.0
FM 21395, F	85.4	10.1	28.8	9.4	47.6	7.0	19.6	18.6
MACN 50.91, F	85	10	28	9	51	8	21	21
Mustela frenata boliviensis								
AM 72587, M	45.6	5.3	15.0	5.0	25.1	—	10.0	11.3
AM 268672, F	39.6	4.5	12.5	4.4	20.6	—	8.8	10.7
Family Procyonidae Subfamily Potosinae								
Bassaricyon alleni								
MACN 50.82, M	81.0	8.7	23.4	4.1	50.0	—	16.2	20.8
CBF 2950, M	75.4	8.8	22.3	5.0	47.9	20.6	15.2	19.3
Potos flavus chapadensis								
BM 26.12.4.33, M	87.9	15.0	26.2	3.7	62.2	—	20.4	18.8
BM 34.9.2.48, M	87.1	14.4	26.5	4.1	62.3	—	21.3	22.0
AM 262665, sex ?	81.5	13.1	25.0	4.1	54.7	—	17.4	21.7
Subfamily Procyoninae								
Nasua nasua boliviensis								
AM 38803, M	120.1	77.1	34.3	4.9	46.2	?	24.2	22.8
AM 246973, F	116	74.4	26.8	6.2	59.6	?	25.3	25.8
AM 38801, F	92.3	—	—	4.7	71.2	—	19.6	24.8
CM 5267, M	117.6	14.9?	27.7	6.6	69.8	—	28.3	23.4
N. n. dorsalis								
Beni, 9 M	116.7–134.0	72.7–81.4	29.4–32.4	6.3–8.1	62.2–78.7	?	23.6–27.7	17.3–24.9
Beni, 3 F	117.7–120.2	72.2–77.3	27.6–30.2	5.4–7.5	60.3–63.2	?	22.5–23.9	21.0–24.6
AM 209129, M	104.4	?	23.0	5.3	51.0	—	21.5	26.5
N. n. spadicea								
AM 214712, F	117.5	76.4	28.9	7.2	60.8	?	21.8	23.5
Procyon c. cancrivorus								
Beni and Santa Cruz, 2 M, 1 F	125.8–135.2	17.7–20.9	38.3–41.4	9.6–10.5	84.8–96.0	?	28.0–30.2	27.8–31.7
Family Ursidae								
Tremarctos ornatus								
USNM 271418, M	228.3	?	66.1	16.7	166.1	?	66.5	63.5
BM 34.9.2.70, M	212.3	28.3	65.5	17.1	143.6	16.8	55.1	56.5
MACN 17830, M	231	33	55	12	163	0	61	57

TABLE 14
External Measurements (in mm) of *Inia geoffrensis*

	AMNH catalog number				
	209101, male	209102, female	209103, female	209105, male	209106, female
From tip of snout:					
To melon	260	245	260	275	220
To anterior margin of eye	325	315	325	340	280
To angle of mouth	310	293	300	315	265
To blow hole	375	370	405	380	330
To anterior margin of flipper	610	520	550	550	485
To posterior margin of flipper	710	605	650	640	570
To highest point of dorsal fin	1250	1080	1200	1140	950
To notch between flukes	2015	1685	1940	1770	1620
To posterior margin of flukes	2065	1770	1980	1830	1650
To anterior base of fluke	1810	1540	1750	1600	1390
To anterior end of ventral groove	1045	860	1000	910	800
To anterior margin of anterior vent	1130	1155	1330	980	1030
To posterior margin of anterior vent	1150	1180	1350	1005	1060
To line between tips of mammae	1440	1175	1335	1235	—
To anterior margin of anus	1485	1210	1380	1270	1085
To posterior margin of anus	1500	1220	1400	1280	1095
To posterior end of ventral groove	1530	1225	1400	1285	—
To tip of flipper folded back	1070	960	1065	1010	880
Flipper					
Length of base	105	80	100	90	80
Arc of anterior margin	500	455	500	460	420
Chord of anterior margin	430	405	450	410	370
Chord of posterior margin	350	335	380	335	298
Greatest width	200	168	180	165	150
Greatest dorsal–ventral	60	35	46	40	35
Eye					
Anteroposterior	8.5	8.5	8	8	8
Dorsoventral	7	6	5	5	7
Width:					
Across flukes	505	440	500	490	430
At peduncle	56	44	53	44	42
Greatest at peduncle	300	270	320	295	230
Distance from snout at greatest	940	930	970	900	800
At neck	215	215	250	250	190
Across head	225	195	220	215	180
Across blow hole	35	35	36	37	33
Depth:					
At peduncle	150	125	150	140	120
One-half girth:					
At peduncle	170	145	170	155	135
At posterior vent	330	285	320	295	245
At anterior vent	500	—	—	477	—

TABLE 14
(*Continued*)

	AMNH catalog number				
	209101, male	209102, female	209103, female	209105, male	209106, female
At greatest width	510	420	520	475	390
At neck	360	320	360	345	295
At snout	120	102	102	105	90
(distance from tip)	215	220	230	240	200
Total length (cm)	201.5	168.5	194	177	162
Weight (kg)	75.4	45.9	69.5	54.5	32.5

TABLE 15
Cranial Measurements (in mm) of *Inia geoffrensis*

	AMNH catalog number					
	209101, male	209102, female	209103, female	209104, sex ?	209105, male	209106, female
Total length skull	495	457	443	367	475	415
Rostrum length	328	315	291	228	320	273
Rostrum basal width	83	73	82	67	77	66
Rostrum, width 60 mm anterior to base	45	39	40	34	39	40
Rostrum, width at middle	24	17	25	18	24	20
Rostrum, width at 3/4 of length	20	13	19	12	17	15
Breadth across preorbital angles of supraorbital processes	134	112	118	103	115	100
Least distance between orbits	115	100	104	92	100	91
Breadth across postorbital angles of supraorbital processes	168	142	154	127	148	123
Zygomatic width	206	175	190	156	186	161
Width of braincase across parietals (*)	83	89	83	89	85	80
Maximum width premaxillae	—	—	—	53	—	45
Length temporal fossa	135	119	131	106	124	102
Height temporal fossa	78	63	73	59	88	60
Tip rostrum–nares length	375	352	334	265	371	316
Length upper toothrow (right side)	302	284	261	211	296	250
Length upper toothrow (left side)	300	283	260	210	294	248
Tip rostrum–pterygoid length	378	350	330	—	362	313
Number of alveoli (right–left, upper)	33–32	33–34	30–29	33–34	31–33	32–32
Length mandible	441	402	423	315	417	360
Height mandible at coronoid	87	77	83	64	83	59
Symphysis mandibles (length)	247	217	231	150	229	187
Length lower toothrow (right side)	294	281	283	212	293	246
Length lower toothrow (left side)	294	285	292	211	293	248
Number alveoli (right–left, lower)	31–32	35–34	33–33	32–32	31–31	31–30

TABLE 16
External Measurements (in mm) of the Artiodactyla

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in kg)
Family Tayassuidae					
Catagonus wagneri (no Bolivian data)					
Paraguay (Wetzel, 1977)	1025–1093	70–102	215–238	115–124	37
Tayassu pecari albirostris					
LACM 51338, M	1015	46	212	80	31.4
LACM 51339, F	1009	55	209	75	36
Ibiato, 8 M	990–1450	30–50	202–229	82–90	25–32
Ibiato, 7 F	930–1115	25–55	202–229	80–92	26–37.5
T. t. tajacu					
AM 255873, M	350	25	86	44	—
U CONN 17516, M	900	50	190	90	—
U CONN 18011, F	892	60	87	93	—
Ibiato, 21 M	854.7 ± 29.7	35.1 ± 9.8	183.4 ± 8.7	84.0 ± 5.3	19.0 ± 2.0
	807–915	16–50	170–200	74–93	16–23
Ibiato, 25 F	860.3 ± 43.5	31.2 ± 7.8	182.7 ± 7.3	83.8 ± 4.0	19.3 ± 2.3
	805–990	14–45	170–195	75–92	15–22
Family Camelidae					
Lama (Vicugna) pacos					
AM 248739, M	1690	250	360	120	45
Family Cervidae					
Hippocamelus antisensis					
BM 34.9.2.188, M	1480	130	—	155	—
BM 34.9.2.189, F	1380	105	—	160	—
Mazama americana					
UM 126854, M	1240	130	320	110	—
CM 2767, M	1440	120	220	100	—
MNLP 527, M	1106	126	307	102	—
Ibiato, 7 M, 4 F	1025–1330	46–200	300–315	91–104	16.5–35.5
M. bricenii chunyi					
AM 73098, M yg.	730	24	124	—	—
M. gouazoupira gouazoupira					
AM 246985, M	931	90	264	105	13
LACM 52536, F	1011	132	281	107	—
Ibiato, 5 M, 4 F	960–1130	78–130	267–322	100–116	13.5–25
Odocoileus (Blastocerus) dichotomus					
Ibiato, F	1763	150	460	180	85.5
Ibiato, F	1700	210	510	192	—

TABLE 17
Cranial Measurements (in mm) of the Artiodactyla

	Condylobasal Length	Palatal Length	Transdental Breadth	Length of Molariform	Zygomatic Breadth	Interorbital	Length of Mandible	Height of Mandible
Family Suidae								
Sus scrofa								
AM 238325, sex ?	275	166	66	101	133	64	246	100
Family Tayassuidae								
Catagonus wagneri								
Paraguay, AM 237508, sex ?	259	190	66	103	126	79	202	89
Paraguay (Wetzel, 1977)	252–280	—	59–74	91–99	108–137	70–89	200–222	86–99
Tayassu pecari albirostris								
CM 20943, sex ?	255	188	55.5	81.7	126.8	68.4	207.5	97.1
CM 20944, sex ?	256	188	52.6	79	121.2	60.6	206.3	92.3
AM 260331, sex ?	—	166.8	51.3	77.5	—	56.2	182.2	83.4
AM 260332, sex ?	—	180.7	53.3	77.3	114.3	61.6	201.4	93.2
T. tajacu tajacu								
15 km SW San Joaquín, AM, 4 M, 3 F, 2 ?	183–202	—	—	—	90.0–101.8	46.0–53.1	—	—
FM 21384, M	196	140	43	64	101	52	162	79
Family Camelidae								
Lama (*Lama*) *glama*								
Zoo, AM 35235, M	277	152	73	74	136	97	240	150
L. (*L.*) *guanicoe*								
Chile, AM 143242, F	271	140	74	65	117	94	236	137
L. (*Vicugna*) *pacos*								
AM 248739, M	243	123	67	57	112	92	211	129
L. (*V.*) *vicugna*								
AM 247747, sex ? yg.	214	109	65	66	—	74	179	—
AM 248742, M yg.	200	97	53	63	97	74	167	102
AM 15997, sex ? yg.	218	105	58	65	101	77	177	120
Family Cervidae								
Hippocamelus antisensis								
BM 34.9.2.188, M	244.6	149.2	69.2	75.3	99.4	75.7	195.6	106.5
BM 34.9.2.190, M	214.6	130.4	66.7	77.7	87.6	66.5	—	—
Mazama americana								
AM 260336, sex ?	185.1	126.2	58.0	57.5	89.7	42.5	159.7	69.3
UM 126854, M	191	119	64	58.4	90.6	42.2	157	75
UM 126855, F	187	120	65	51.6	90.6	42.9	153	76
CM 2767, M	203	132	65	61	94	48	—	85
M. bricenii chunyi								
AM 73098, M juv.	110.2	69.4	42.1	37.9	59.7	27.1	90.6	46.1
M. gouazoupira gouazoupira								
Near San Joaquín, AM, 3 M, 3 F	142.2–180.5	90.3–114.5	51.6–59.6	52.4–57.0	71.2–75.3	32.7–45.8	116.1–148.0	59.3–76.5
Odocoileus (*Blastocerus*) *dichotomus*								
BM 11.10.27.4, M	294	190	82	85	112	68.1	261	113
O. (*Odocoileus*) *virginianus peruvianus*								
Panama, AM 18951, M	210	137	68	65	92	55	170	87
O. (*Ozotoceros*) *bezoarticus leucogaster*								
MNH-NKM, M yg.	208	136	66	66	—	50	188	85

TABLE 17
(*Continued*)

	Condylo-basal Length	Palatal Length	Trans-dental Breadth	Length of Molariform	Zygo-matic Breadth	Inter-orbital	Length of Mandible	Height of Mandible
			Family Bovidae					
Bos taurus								
AM 235196, sex ?	437	256	131	125	178	143	—	—
AM 123180, M	461	267	146	130	213	157	381	220
Capra hircus								
AM 261367, sex ?	223	110	70	62	104	86	—	—
AM 42700, sex ?	234	135	69	72	104	86	190	102
Ovis aries								
AM 21528, M	259	138	68	65	106	74	206	110

TABLE 18
External Measurements (in mm) of the Rodentia

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)	Head plus Body
		Family Sciuridae				
Sciurus ignitus argentinius						
ANSP 18193, M	342	168	48	25	—	174
FM 105939, M	450	230	45	30	—	220
ANSP 18192, M	364	175	51	27	—	189
S. i. boliviensis						
Samaipata, 2 F, 3 M	353–382	162–191	43–50	22–25	—	169–193
S. i. ignitus						
Mapiri, BM and AM, 4 M, 1 F	315–360	175–186	42–45	23–25	—	140–174
N Caranavi, AM, 1 M, 2 F	344–401	174–199	44–50	23–29	183–242	171–202
S. spadiceus						
16 Beni and 4 Santa Cruz	440–575	200–345	52–71	29–38	400–700	165–303
		Family Muridae Subfamily Murinae				
Mus musculus						
Near Pocoata, 8 M, 3 F	138–188	68–95	17–19	11–14	10–26	70–93
Caracato, 2 M, 2 F	168–200	87–97	14–17	13–17	19–24	81–103
Rattus rattus						
AM 247892, M	408	240	36	23	140	168
AM 255983, M	344	183	36	22	—	161
AM 260773, M	295	162	33	22	70	130
AM 260774, F	373	212	35	23	138	161
		Subfamily Sigmodontinae Tribe Oryzomyini				
Microryzomys minutus						
25 km W Comarapa, 13 M, 1 F	172–205	107–128	21–23	16–18	10–14	66–86
AM 72733, M	216	132	24	—	—	84

TABLE 18
(*Continued*)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)	Head plus Body
Neacomys s. spinosus						
35 km N Caranavi, 2 M, 3 F	162–181	90–103	20–23	13–15	11–21	71–86
Nectomys squamipes garleppii						
Charuplaya, AM and BM, 3 M, 4 F	313–420	168–225	42–47	18–23	240	135–202
Oecomys b. bicolor						
San Joaquín, US and FM, 6 M, 5 F	187–234	99–143	18–24	13–16	20–46	79–108
O. concolor						
AM 210023, M	248	131	26.5	19	53	117
O. mamorae						
Buenavista, FM, 2 M, 1 F	275–325	140–165	27–30	18–20	—	135–160
Todos Santos, AM, 8 M, 9 F	260–315	112–170	25–30	15–20	—	122–150
O. roberti						
AM 262825, M	263	142	26	16	40	121
AM 248996, F	292	157	27	18	65	135
Oligoryzomys andinus						
AMNH 255946, F	228	136	26	14.5	21.5	92
AMNH 260406, F	213	117	25	14	22	96
O. chacoensis						
Olds and Anderson	227.4 ± 12.4	134.3 ± 10.3	25.3 ± 1.3	16.7 ± 1.3	—	—
(1987), *n* = 15	204–252	112–150	23–28	14–18	—	—
O. destructor						
Chimate, BM, 3 M, 5 F	184–228	98–130	21–25	15–17	—	85–98
Incachaca, AM, 1 M, 2 F	227–230	135–136	22–25	15	—	91–95
Near Totora, AM, 1 M, 2 F	243–244	135–140	19–25	15–17	26–33.5	103–108
O. flavescens group, species B						
Tapecua, 12 M, 9 F	184–234	110–143	20–25	15–19	14–27	76–113
O. microtis						
Olds and Anderson	185.9 ± 11.1	101.0 ± 6.7	22.8 ± 1.2	14.4 ± 1.04	—	—
(1987), *n* = 67	165–214	87–116	19–25	12–16	—	—
Oryzomys capito						
Opposite Costa Marques, 7 M, 4 F	215–268	101–120	29–33	18–27	41–87	114–149
O. legatus						
Río Limon, 4 M	264–308	134–150	34–35	25	58–94	130–158
O. levipes						
Incachaca, 15 M, 6 F	251–310	140–175	29–32	21–28	—	125–150
O. nitidus						
Estancia Cachuela Esperanza, AM, 5 M, 6 F	238–279	122–159	30–34	20–24	38–82	119–145
O. subflavus						
San Miguel Rincón, AM and MSB, 4 M, 5 F	292–358	166–205	32–38	19–22	47–115	126–164
O. yunganus						
BM 1.1.1.65, M	246	118	28	22	—	128
BM 2.1.1.39, M	253	128	28	—	—	—
Rhipidomys couesi austrinus						
UM 155866, M	297	165	31	25	70	132
UM 155867, M	265	140	28	24	49	125
UM 155864, M	285	148	30	24	61	137
UM 155865, M	267	136	28	24	51	129

TABLE 18
(*Continued*)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)	Head plus Body
R. leucodactylus rex						
BM 34.9.2.172, M	450	250	35	26	—	200
R. nitela						
AM 119406, F	235	125	22	22	—	110
UM 156298, M	213	113	20	19	29	100
Thomasomys a. aureus						
Río Aceramarca, 3 M	324–355	184–215	33–36	—	—	128–140
AM 260422, F	315	184	31	22	55	131
T. daphne australis						
Río Aceramarca, UM, 4 M, 3 F	213–235	118–146	22–27	17–21	23–26	89–106
AM 38550, M	227	138	25	19	—	89
T. ladewi						
Río Aceramarca, AM 72113, F	294	158	33	—	—	136
Río Aceramarca, AM 72114, M	286	153	32	—	—	133
Río Aceramarca, UM 156294, F	287	160	32	23	78	127
T. oreas						
AM 72129, F	230	132	26	—	—	98
AM 72130, M, holotype	244	136	25	—	—	108
T. taczanowskii						
FM 74866, M	177	102	27	18	—	75
FM 74867, M	215	125	23	19	—	90
T. sp. ?						
CM 5260, sex ?	465	265	40	22	—	200
		Tribe Akodontini				
Akodon aerosus baliolus						
Yungas, AM, 2 M, 6 F	172–205	70–86	22–25	15–18	—	96–119
A. albiventer berlepschii						
Vicinity of Huancaroma, AM and MSB, 10 M, 6 F	156–183	66–76	20–23	12–15	21–36	86–109
A. boliviensis						
Río Aceramarca, 6 M, 2 F	160–183	64–79	20–23	13–20	16–24	90–104
Río Tomayapo, AM, 3 M, 6 F	146–166	60–73	20–21	13–16	13–24	85–96
A. dayi						
Ayacucho, AM, 6	195–213	76–90	26–28	16–19	26–41	95–118
A. fumeus						
Dept. Cochabamba, BM, 8, sex ?	173–200	75–95	17–18	17	—	95–108
A. lutescens caenosus						
2 km SW Monteagudo, AM, 11 M, 7 F	131–160	57–72	18–23	10–15	8.5–21	67–94
A. l. lutescens						
AM 247850, M	144	60	13	14	14	84
AM 247851, M	129	54	13	13	12.5	75

TABLE 18
(*Continued*)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)	Head plus Body
A. l. puer						
BM 2.1.1.78, holotype, F	143	65	19	14	—	78
BM 2.1.1.76, M	140	65	19	15	—	75
BM 2.1.1.77, M	135	60	18	13	—	75
21 km W Comarapa, AM, 5 M, 6 F	137–163	54–72	17–20	13–15	13–21	70–96
A. mimus						
Siberia, UM, 8 M, 6 F	163–192	76–97	22–25	17–21	13–27	84–104
A. pervalens						
Carapari, holotype	209	93	24.6	—	—	116
A. siberiae						
Vicinity of Siberia, AM and MSB, 7 M, 7 F	176–205	77–101	22–26	17–21	21–31	93–112
AM 260432, holotype, F	183	88	24	18	23.5	95
A. simulator tartareus						
UM 155860, M	215	88	25	21	61	127
UM 156324, M	190	85	21	18	32	105
MVZ 119944, M	193	85	25	18	—	108
MVZ 119946, M	177	78	24	18	—	99
Tablada, 4 M, 2 F	187–213	83–91	20–24	17–18	—	104–124
A. subfuscus subfuscus						
Sorata, 3 M, 4 F	160–182	68–78	21–23	17	21.5	92–121
A. toba						
Tarija, AM, 13	153–226	67–100	24–27	16–20	25–57	91–126
A. varius						
Vintó, AM, 8 M, 1 F	185–250	80–110	25–29	15–17	—	105–158
Bolomys amoenus						
Near Rodeo, 4	171–176	70–79	20–22	12–14	39–54	97–104
B. l. lactens						
Tambo, 4	172–216	73–86	23–26	14–19	25–50	99–128
B. lenguarum tapirapoanus						
Santa Cruz, AM, 8	172–206	70–86	24–26.5	15–18	42–50	111–128
Chroeomys andinus dolichonyx						
BM 26.6.12.57, F	137	54	18	13	—	83
MSB 57086, F	122	56	20	13	12	66
C. jelskii bacchante						
BM 2.1.1.66, M	187	85	25	—	—	102
C. j. pulcherrimus						
Pelechuco, AM, 4 M, 1 F	174–189	73–88	24–25	20–23	32–36	101–108
C. j. sodalis						
Lipez, BM, 4 M, 3 F	173–189	77–88	22.9–23.9	18–19.1	—	92–107
Lenoxus apicalis boliviae						
Ñequejahuira, AM, 10 M, 5 F	251–322	133–172	32–36	—	—	118–154
Oxymycterus hucucha						
AM 260583, M	[176]	[60]	23	14	36	[116]
AM 246721, M	174	75	21	14	25	99
MVZ 119948, F	180	71	21	15	—	109
O. inca doris						
Incachaca, AM, FM, and CM, 8 M, 2 F	232–295	96–140	25–31	19–24	—	120–155

TABLE 18
(*Continued*)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)	Head plus Body
O. inca iris						
Estancia Cachuela Esperanza, AM and MSB, 3 M, 1 F	266–294	92–110	33–35	19–22	89–120	161–184
O. paramensis jacentior						
Pino, 3 M, 1 F	215–252	94–104	25.7–27	18.3–19.3	—	121–148
O. p. nigrifrons						
Río Aceramarca, AM, 4 M, 6 F	217–247	88–108	26–28	—	—	129–143
O. p. paramensis						
Colomi, FM, 6 M	190–236	80–106	15–20	21–25	—	110–130
Tribe Scapteromyini						
Kunsia t. tomentosus						
US 364760, F	435	160	48	30	580	275
EBD 8750, M	417	185	42	33	470	232
Tribe uncertain						
Pseudoryzomys simplex						
AM 262048, F	249	132	30	18	47	117
FM 118810, M	280	140	30	17	53	140
MS 364749, F	215	105	24	15	32	110
US 390668, F	226	132	28	18	46	94
Tribe Phyllotini						
Andinomys e. edax						
Near Camataqui, 3 M, 3 F	260–281	125–132	28–29	24–25	66–80	134–149
Auliscomys (Maresomys) b. boliviensis						
Near Cruce Ventilla, AM, 4 M, 2 F	206–242	87–109	28–31	23–30	71–84	117–136
Auliscomys (Auliscomys) pictus						
Near Ulla Ulla, 3 M, 1 F	198–213	89–94	26	21–24	44–60	109–120
AM 72727, F	190	74	26	—	—	116
A. (A.) sublimus leucurus						
Lipez, 3 M, 1 F	151–174	49–64	21–23	19–23	—	102–118
A. (A.) s. sublimis						
Ulla Ulla, 4 M, 2 F	148–169	51–64	22–23	21–22	28–44	92–105
Calomys c. callosus						
Laguna Palmar, 6 M, 8 F	162–224	78–110	21–23	16–19	30–52	99–122
C. laucha						
2119/6325, 7 M	112–130	45–55	14–17	12–13	8–12	62–80
AM 246849, F	129	51	16	13	14	78
AM 246867, F	119	53	16	12	9	66
C. lepidus carillus						
AM 268863, F	120	47	16	16	11	73
MSB 70536, M	108	42	16	16	7	66
C. lepidus ducillus						
Near Huancaroma, AM, 11 M, 4 F	103–128	34–47	16–18	15–18	10–18	64–84
C. musculinus						
MVZ 119955, M	144	64	19	15	—	80
MVZ 119956, M	152	78	20	17	—	74
AM 246798, M	159	88	18	14	12.2	71

TABLE 18
(*Continued*)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)	Head plus Body
C. tener						
MSB 63396, M	138	60	17	13	14.5	78
C. venustus						
Chuquisaca, 4 M, 5 F	202–232	86–99	21–26	14–21	60–85	119–138
La Paz, AM 262780, M	227	96	25	18	—	131
Chinchillula sahamae						
Near Ulla Ulla, AM, 3 M, 1 F	253–282	94–114	34–37	35–38	110–155	153–168
Eligmodontia puerulus						
Olds et al. (1987: 10)	172	83	29	18	—	89
Oruro, BM, 3 M, 1 F	152–168	74–84	23–25	18	—	78–84
Río Barros, AM, 1 M, 3 F	162–172	76–85	23–26	16–20	17–21	80–86
Galenomys garleppii						
AM 246946, M	154	44	24	22	59	110
AM 246947, F	155	40	24	22	60	115
Graomys domorum domorum						
Near Peña Blanca, 3 M, 1 F	247–298	143–170	29–31	22–25	38–60	104–128
Olds et al. (1987), *n* = 11	—	124.9 ± 23.9	29.4 ± 1.9	25.1 ± 1.5	—	136.8 ± 11.4
	—	(83–165)	(26–32)	(22–28)	—	(120–152)
G. d. taterona						
Tupiza, 2 M, 3 F	256–295	139–164	28–29	23–25	—	122–135
G. griseoflavus griseoflavus						
Olds et al. (1987), *n* = 12	—	154.7 ± 15.7	29.0 ± 1.9	22.5 ± 2.3	—	131.6 ± 14.8
	—	124–175	25–31	20–26	—	(111–150)
G. pearsoni dorbignyi						
MSB 55245, M	159	136	27	24	—	123
AM 260792, F	155	129	26	23	—	126
Neotomys e. ebriosus						
Pongo, 5 M, 2 F	162–235	65–86	24–26	—	—	97–149
N. e. vulturnus						
Lipez, BM, 2 M, 2 F	196–203	75–80	21–23	17	—	119–123
Phyllotis caprinus						
Near Camataqui, 9 M, 6 F	214–264	120–146	24–26	23–25	26–42	94–118
P. chilensis						
Near Sajama, 24 M, 8 F	210–270	99–144	21–29	22–30	35–62	105–126
6 km NE Lagunas, 4 M, 2 F	208–233	100–122	26–28	25–28	33–50	104–113
P. o. osilae						
Charazani, 4 M, 3 F	217–268	119–145	26–29	22–24	31–50	101–123
P. o. phaeus						
Pelechuco, 5 M, 2 F	225–258	124–134	26–29	22–24	32–56	101–121
P. wolffsohni						
Cochabamba Dept., MVZ, 3 M, 3 F, 1 ?	225–293	114–158	26–30	23–26	43–70	111–137
P. xanthopygus rupestris						
Laguna Viscachani, AM, 4 M, 1 F	260–290	139–156	26–30	22–24	45–56	116–138
Undescribed phyllotine						
CBF 2414	—	—	33	25	94	139
AMNH 264448, M	267	143	33	25	49	124

TABLE 18
(*Continued*)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)	Head plus Body
Tribe Sigmodontini						
Holochilus sciureus amazonicus						
Near Tita, AM and MSB, 3 M, 4 F	272–350	133–183	33–43	14–21	65–160	139–173
Tribe Ichthyomyini						
Chibchanomys, not identified to species						
TLY 1519, F yg.	178	81	24	11	18	97
Suborder Hystricognathi Family Erethizontidae						
Coendou bicolor simonsi						
AM 214610, F	1033	540	98	27	—	493
AM 214611, F	973	500	98	30	—	473
AM 214612, F	965	496	100	30	—	469
C. prehensilis boliviensis						
AM 214613, M	900	473	85	28	—	427
AM 214614, M	1035	520	105	33	—	515
BM 34.9.2.178, M	1250	570	—	—	—	680
BM 34.9.2.179, F	970	485	85	—	—	485
Ibiato, 2 M, 3 F	950–1115	455–565	80–100	12–25	3800–5900	480–610
Family Chinchillidae						
Chinchilla chinchilla						
Cord. de Ascotan, BM, 1 M, 2 F	220–256	153–175	57–59	60–62	—	67–100
Lagidium viscacia cuscus						
AM 38981, F	660	300	90	70	—	360
FM 31671, F	645	300	95	70	—	345
FM 31672, M	760	360	90	80	—	400
L. v. cuvieri						
Estación Perez, FM, 4 M, 4 F	630–695	285–365	85–100	70–85	—	330–380
L. v. perlutea						
Oploca, ANSP, 3 M, 1 F	695–765	305–325	95–102	82–86	—	370–460
Lagostomus maximus inmollis						
LACM 27363, F	580	164	115	51	2960	416
LACM 27362, F	620	137	121	38	3640	483
LACM 62832, M	639	177	127	54	4100	462
Family Dinomyidae						
Dinomys branickii						
AM 185372, sex ?	738	168	118	22 (est.)	—	570
MACN 12961, M ad.	1000	240	110	35	—	635
Family Caviidae Subfamily Caviinae						
Cavia tschudii nana						
Chapare, BM, 1 M, 2 F	230–250	0	35–36	25–30	—	230–250
Incachaca, AM, 1 M, 3 F	230–250	7–9	39–45	21–26	—	221–243

TABLE 18
(*Continued*)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)	Head plus Body
Galea m. auceps						
AM 268934, F	248	9	41	16	317	239
G. m. musteloides						
Tupiza, BM, 1 M, 3 F	203–223	0	37–40	17–21	—	203–223
G. spixii campicola						
Guanacos, CM, 2 M, 4 F	195–280	0	35–40	19–24	—	195–280
Microcavia n. niata						
Esperanza, FM, 11 M, 7 F	170–190	0	30–35	20	—	170–190
			Subfamily Dolichotinae			
Dolichotis s. salinicola						
AM 246955, F	485	36	98	67	—	449
LACM 27369, M	424	20	94	60	—	404
			Family Hydrochaeridae			
Hydrochaeris h. hydrochaeris						
AM 209107, F	1000	20	220	70	31 kg	980
Ichilo, AM, 3 F	800–930	180–203	155–180	52–60	18.4–27.5 kg	620–727
			Family Dasyproctidae			
Dasyprocta punctata boliviae						
AM 246956, M	404	29	99	39	1108	375
AM 246957, F	562	34	118	45	4000	528
ANSP 18211, F	562	23	130	33	—	539
ANSP 18212, M	572	37	135	45	—	535
D. p. yungarum						
FM 96173, F	522	20	120	39	—	502
ANSP 19426, M	520	26	125	41	—	494
ANSP 19427, F	545	31	125	45	—	514
Ibiato, 17 M	549.6 ± 15.4	20.9 ± 5.6	120.9 ± 5.3	39.3 ± 4.8	3870 ± 290	528.6 ± 14.6
	530–580	11–35	110–129	32–50	3500–4400	511–554
Ibiato, 37 F	559.4 ± 19.6	24.0 ± 5.36	120 ± 4.58	38.5 ± 5.8	4020 ± 400	535.4 ± 19.1
	505–595	10–35	110–130	20–52	3500–5200	485–570
			Family Agoutidae			
Agouti p. paca						
AM 38804, M	730	15	115	45	—	715
UM 126853, F	650	20	109	42	—	630
ANSP 14269, F	690	15	92	38	—	675
Ibiato, 11 M	585–722	8–20	104–120	41–52	6000–9250	572–709
Ibiato, 10 F	557–720	12–25	102–120	38–55	5570–8750	542–704
			Family Octodontidae Subfamily Ctenomyinae			
Ctenomys boliviensis boliviensis						
AM 260804, M	356	80	46	12	650	276
AM 260801, F	316	95	45	9	420	221
C. conoveri						
AM 262291, M	356	91	54	15	520	265
MSB 56088, M	680	122	60	15	1200	558

TABLE 18
(Continued)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)	Head plus Body
C. frater mordosus						
Tambo, AM, 2 M, 3 F	229–272	55–76	31–36	7–9	140–290	173–196
C. goodfellowi						
BM 20.11.17.6, M	333	93	40	—	—	240
AM 262288, F	257	71	37	8	205	186
AM 262289, F	290	76	37	8	250	214
MSB 56087, F	288	79	40	7	270	209
C. leucodon						
BM 1901.6.7.56, M	200	85	34	8	—	115
AM 263028, F	251	79	34	4	—	172
AM 263029, M	168	46	27	3	57	122
C. lewisi						
Sama, BM, 4 M, 4 F	168–211	63–86	34.1–39.1	—	—	100–133
C. minutus						
MSB 55367, M	199	58	30	5	79	141
AM 260835, F	220	63	30	5	105	157
C. opimus opimus						
Vicinity of Huancaroma, MSB, 3 M, 2 F	270–340	75–94	40–45	9–11	200–457	193–251
C. steinbachi						
AM 262297, F	350	102	45	8	—	248
AM 260853, M	314	83	44	8	360	231
			Subfamily Octodontinae			
Octodontomys gliroides						
Oruro, BM, 3 M, 3 F	314–332	150–156	35–39	25–28	—	160–180
			Family Abrocomidae			
Abrocoma boliviensis						
BM 34.9.2.171, F	320	150	30	20	—	170
MVZ 120238, F	310	132	30	25	—	178
A. c. cinerea						
Sama, 5 F, 5 M	228–294	53–97	20–27	23–28	—	186–204
			Family Echimyidae Subfamily Dactylomyinae			
Dactylomys boliviensis						
AM 38709, F	710	410	60	20	—	300
UM 126767, M	615	348	50	—	—	267
UM 127168, M	620	350	52	20	—	270
BM 1901.6.7.57, F	440	245	42	20	—	195
			Subfamily Echimyinae			
Echimys didelphoides						
AM 210354, M	319	154	35	18	112	165
AM 210355, M	421	205	42	15	282	216
Isothrix bistriata bistriata						
AM 210353, F	485	235	47	20	34	250

TABLE 18
(*Continued*)

	Total Length	Length of Tail	Length of Hind Foot	Length of Ear	Weight (in g)	Head plus Body
			Subfamily Eumysopinae			
Mesomys hispidus						
TTU 34988, F	353	171	28	14	—	182
Proechimys brevicauda						
Near San Antonio, AM, 5 M, 2 F	285–390	110–150	42–50	21–25	—	175–246
P. hilda						
AM 214670, F	245	99	39	20	91	146
P. longicaudatus						
Estación Pailón, AM and MSB, 4 M, 6 F	300–348	126–143	42–45	19–28	175–265	171–206
P. simonsi						
AM 38763, M	430	195	52	22	—	235
AM 263059, M	214	77	38	18	65	137
AM 263061, M	292	126	34	19	115	166
AM 263062, F	397	174	47	23.5	320	223
P. steerei						
La Cruz, 2 M, 7 F	277–344	108–138	41–47	20–22	120–190	167–206
Thrichomys apereoides fosteri						
AM 260860, M yg.	230	111	32	20	50	119
Paraguay, AM 248463, M	425	200	98	24	350	225
			Family Myocastoridae			
Myocastor coypus popelairi						
FM 25257, M	895	320	110	20	—	575
FM 25258, F	995	420	115	20	—	575

TABLE 19
Cranial Measurements (in mm) of the Sciuridae

	Occipitonasal Length	Interorbital Breadth	Postorbital Breadth	Breadth of Braincase	Tooth Row Length	Dental Span
Sciurus ignitus argentinius						
ANSP 18193, M	49.1	15.9	16.7	20.1	8.0	11.3
ANSP 18192, M	50.8	16.5	17.6	20.1	8.5	11.8
S. i. boliviensis						
Samaipata, AM, 3 M, 2 F	46.5–49.0	13.5–16.2	16.9–17.9	19.3–20.2	7.2–8.4	10.8–11.7
S. i. ignitus						
AM 72586, M	44.5	14.2	15.7	20.0	8.6	11.0
BM 01.1.1.58, M	45.0	14.4	16.2	19.1	7.4	11.0
BM 01.1.1.59, M	45.2	14.3	17.2	19.3	7.2	10.6
BM 01.1.1.60, M	43.7	12.8	16.5	18.1	7.6	11.6
S. spadiceus						
8 Beni and 4 Santa Cruz	61.1–64.6	19.6–22.5	17.5–21.0	21.6–24.2	8.9–10.8	12.6–15.2

TABLE 20
Cranial Measurements (in mm) of the Muridae

	Occipito-nasal Length	Alveolar Length of Tooth Row	Length of Rostrum	Breadth of Braincase	Post-dental Breadth	Posterior Zygomatic Breadth	Breadth of M1	Inter-orbital Breadth
Subfamily Murinae								
Mus musculus								
Caracato, 2 M, 2 F	21.5–23.2	2.6–3.8	6.0–6.7	9.0–9.6	2.9–3.4	10.9–11.8	1.0–1.1	3.5–3.7
Rattus rattus								
AM 247892, M	41.6	7.1	13.0	15.7	6.1	19.6	1.8	5.7
AM 264948, F	41.4	7.2	12.8	15.4	5.8	19.7	1.9	5.6
Subfamily Sigmodontinae Tribe Oryzomyini								
Microryzomys minutus								
AM 72733, M	23.3	3.3	7.3	11.1	3.5	13.0	0.9	3.4
Neacomys s. spinosus								
Pando, AM 262822, F	21.0	3.2	5.7	10.2	3.3	11.3	0.9	4.0
Pando, AM 262824, F	23.7	3.2	7.3	10.4	3.3	11.7	1.0	4.6
Nectomys squamipes garleppii								
Peru, AM 16057, M	47.9	7.4	14.8	17.0	7.3	25.6	3.1	7.2
UM 126771, M	—	7.5	14.1	15.7	6.7	22.8	2.4	6.7
Oecomys b. bicolor								
AM 246808, F	27.6	4.2	7.7	12.9	4.1	14.6	1.2	4.5
AM 262010, F	28.6	4.2	8.2	12.2	4.0	14.8	1.2	5.0
O. concolor								
AM 209987, M	29.2	4.8	—	—	—	16.6	—	5.4
O. mamorae								
AM 262099, F	26.0	5.3	7.2	13.2	5.3	14.8	1.5	4.6
AM 262014, sex ?	25.4	5.4	7.1	13.1	5.4	14.6	1.5	4.8
AM 262013, M	33.5	5.4	9.7	13.6	5.0	18.1	1.5	5.0
O. roberti								
AM 248996, F	32.6	5.0	—	—	—	16.3	—	5.4
AM 262825, M	29.6	—	—	—	—	—	—	—
Oligoryzomys andinus								
AM 260405, M	22.8	3.7	6.3	11.1	3.8	11.9	1.0	3.4
AM 255946, F	24.7	4.0	7.2	11.5	3.5	13.3	1.1	3.9
O. chacoensis								
Olds and Anderson	24.9 ± 0.8	—	7.3 ± 0.4	11.3 ± 0.4	—	13.1 ± 0.6	1.1 ± 0.1	3.9 ± 0.2
(1987), *n* = 15	23.3–26.7	—	6.6–7.9	10.4–11.9	—	11.9–14.0	0.9–1.1	3.5–4.3
O. destructor								
38534, F subad.	24.1	3.6	7.0	11.2	3.8	12.9	1.0	3.6
AM 264139, F old	27.8	3.8	8.5	11.3	3.5	13.5	1.1	3.5
O. flavescens group, species B								
AM 263827, M	26.9	4.0	8.1	11.4	3.4	13.6	1.1	3.7
AM 263834, M	25.2	3.8	7.3	11.3	3.6	13.5	1.1	3.7
AM 263838, M	26.3	3.7	7.8	11.2	3.5	12.7	1.0	3.7
O. microtis								
Olds and Anderson	23.5 ± 1.1	—	6.8 ± 0.5	10.8 ± 0.4	—	12.3 ± 0.5	0.9 ± 0.1	3.8 ± 0.2
(1987), *n* = 67	21.2–25.8	—	5.2–8.2	9.4–11.8	—	11.4–13.7	0.8–1.1	3.4–4.2
Oryzomys capito								
Baures River, AM, 6 F	30.3–34.4	5.1–5.3	9.6–10.8	12.6–13.2	4.5–4.8	15.7–17.2	1.3–1.6	4.7–5.0
O. legatus								
AM, 5 M, 2 F	34.5–36.0	5.0–5.4	11.9–12.6	13.4–14.2	5.0–5.3	17.4–18.7	1.5–1.7	5.3–5.9
O. levipes								
Comarapa, AM, 3 M, 2 F	30.1–35.1	6.0–6.4	9.3–11.2	13.6–14.2	5.2–5.6	15.9–18.3	1.7–1.8	5.0–5.4
O. nitidus								
Yacuma, AM, 3 M, 2 F, 1 ?	30.2–34.7	4.7–5.1	9.8–11.0	12.7–13.1	4.4–4.8	14.4–17.7	1.4–1.6	4.8–5.3
O. subflavus								
San Miguel Rincón, AM, 2 M, 2 F	33.9–36.9	5.3–6.0	10.2–11.7	14.2–14.8	4.4–5.1	17.7–19.5	1.5–1.6	5.3–5.5

TABLE 20
(*Continued*)

	Occipito-nasal Length	Alveolar Length of Tooth Row	Length of Rostrum	Breadth of Braincase	Post-dental Breadth	Posterior Zygomatic Breadth	Breadth of M1	Inter-orbital Breadth
O. yunganus								
BM 2.1.1.39, M	31.3	5.0	10.2	12.6	4.4	16.5	2.0	4.5
Rhipidomys couesi austrinus								
BM 25.2.1.39, M	33.8	5.8	—	—	—	17.8	1.6	5.2
Chijchipani, AM, 2 M, 1 F, 3 ?	32.8–37.9	6.0–6.5	9.0–11.0	15.1–15.8	5.3–5.6	18.5–21.0	1.6–1.8	5.0–5.9
FM 72881, F	36.3	6.2	10.4	14.9	5.1	—	1.8	5.3
R. leucodactylus rex								
BM 34.9.2.172, M	42.1	6.9	—	—	—	23.5	1.9	6.7
BM 27.11.1.125, F	45.7	7.2	—	—	—	24.4	2.0	6.8
Thomasomys a. aureus								
AM 72110, M	36.5	6.8	11.7	15.4	5.4	18.8	2.2	7.7
FM 74865, M	35.4	6.6	11.4	14.9	5.7	—	2.0	4.5
UM 155878, F	37.0	6.8	11.4	15.1	5.4	19.0	2.4	4.6
T. daphne australis								
AM 38550, holotype, M	27.3	4.0	8.2	12.6	3.8	14.0	1.4	4.6
T. ladewi								
AM 72113, holotype, F	33.3	6.0	10.5	15.6	5.6	18.7	2.4	5.2
AM 72114, M	32.9	5.8	10.2	15.0	5.4	18.2	2.2	5.6
UM 156294, F	33.5	5.9	11.3	15.6	5.5	18.3	2.2	5.3
T. oreas								
AM 72130, holotype, M	29.1	4.4	8.9	13.2	4.1	15.4	1.5	4.0
Tribe Akodontini								
Akodon aerosus baliolus								
Chulumani, BM, 4 M, 1 F	27.8–29.4	4.6–4.9	8.5–8.8	12.9–13.5	3.5–3.8	14.2–15.4	1.3–1.4	5.2–5.7
A. albiventer berlepschii								
Lipez, BM, 4	23.9–25.4	4.1–4.4	6.6–7.3	11.2–11.6	3.1–3.5	12.5–13.1	1.2	4.4–4.7
A. boliviensis								
BM 2.1.1.75, M	26.3	4.5	—	11.7	3.5	13.5	1.5	4.4
Iscayachi, AM, 2 M, 4 F	22.6–24.7	3.9–4.2	6.3–7.7	10.8–11.3	2.7–3.0	11.6–12.3	1.0–1.2	3.9–4.6
A. dayi								
Ayacucho, AM, 6	28.7–31.0	5.0–5.2	8.8–9.6	12.2–13.2	4.0–4.4	14.9–15.8	1.3–1.4	4.7–5.2
A. fumeus								
BM 2.1.1.80, F	26.0	4.0	—	12.0	—	12.7	—	5.2
Cochabamba, AM, 5	25.1–26.3	4.3–4.7	8.2–8.7	11.4–11.5	3.0–3.3	13.2–14.0	1.0–1.3	4.6–4.9
A. lutescens caenosus								
Near Iscayachi, AM, 4 M, 2 F	22.5–23.8	3.9–4.2	6.7–7.2	11.0–11.5	2.9–3.3	11.6–12.1	1.1–1.3	4.2–4.6
A. l. lutescens								
AM 247850, M	23.2	3.4	6.9	10.7	2.7	11.1	1.0	4.2
AM 247851, M	21.9	3.4	—	10.7	2.7	11.0	1.1	4.1
A. l. puer								
BM 2.1.1.78, holotype, F	23.7	3.8	7.3	10.0	3.0	11.7	1.2	4.2
21 km W Comarapa, AM, 3 M, 3 F	23.2–24.0	3.7–4.0	6.6–7.5	10.7–11.2	2.8–3.2	11.4–12.1	1.1–1.4	4.4–4.7
A. mimus								
Comarapa, AM, 4 M, 1 F	26.8–28.3	4.4–4.7	9.6–10.2	11.5–11.8	2.9–3.2	13.1–14.4	1.2–1.3	5.4–5.6
A. pervalens								
Carapari, holotype	30.0	4.7	—	12.8	—	—	—	5.2
A. siberiae								
AM, 8 M, 6 F	26.4–28.0	4.6–5.0	8.8–9.8	11.8–12.8	3.3–3.8	13.5–14.4	1.1–1.4	5.1–5.6
A. simulator tartareus								
Carlazo, BM, 7 M	29.8–31.7	4.8–5.2	9.1–9.7	12.4–13.0	3.6–3.9	15.0–16.1	1.3–1.5	4.9–5.3
A. subfuscus subfuscus								
Sorata, AM, 5	24.5–27.0	4.0–4.4	7.6–8.4	11.4–11.7	3.1–3.3	12.6–13.4	1.2–1.4	4.5–4.8

TABLE 20
(*Continued*)

	Occipito-nasal Length	Alveolar Length of Tooth Row	Length of Rostrum	Breadth of Braincase	Post-dental Breadth	Posterior Zygomatic Breadth	Breadth of M1	Inter-orbital Breadth
A. toba								
Tarija, AM, 6	27.3–30.0	4.7–5.6	8.0–9.2	11.0–12.5	3.6–4.1	14.3–15.2	1.2–1.4	4.8–5.2
A. varius								
Parotani, AM, 5	26.7–30.0	4.9–5.6	8.0–9.2	12.2–12.7	3.7–4.1	14.0–16.0	1.3–1.4	4.8–5.3
Bolomys amoenus								
Rodeo, AM, 4	25.6–26.4	4.3–4.6	7.3–7.8	11.2–11.7	3.0–3.3	14.4–14.9	1.2–1.3	4.5–4.6
B. l. lactens								
Tambo, AM, 4	26.3–30.1	4.8–5.2	7.2–8.4	12.0–12.9	2.8–3.0	14.4–16.8	1.4–1.5	4.9–5.6
B. lenguarum tapirapoanus								
Santa Cruz, AM, 8	27.6–29.3	4.8–5.3	8.0–8.6	11.7–12.8	3.2–3.9	14.3–15.7	1.2–1.4	4.6–5.3
Chroeomys andinus dolichonyx								
BM 26.6.12.57, F	23.5	3.4	6.7	11.1	3.5	11.6	1.2	4.2
C. jelskii bacchante								
BM 2.1.1.66, M	—	4.2	8.9	—	—	—	1.3	5.0
C. j. ochrotis								
Pongo, 6 M, 2 F	27.7–29.8	4.5–4.9	8.5–9.5	12.5–13.3	3.8–4.0	13.9–14.7	1.4–1.7	4.7–5.1
C. j. sodalis								
BM 26.6.12.69, M	28.4	4.4	8.8	12.8	4.1	13.8	1.4	4.6
BM 26.6.12.72, F	28.5	4.4	9.0	12.9	4.0	13.5	1.4	4.7
BM 26.6.12.74, F	28.2	4.4	9.0	12.8	4.1	13.6	1.4	4.6
Lenoxus apicalis boliviae								
Ñequejahuira, AM, 4 M, 6 F	33.8–37.7	5.5–6.2	12.4–14.4	13.8–14.8	4.8–5.5	15.4–18.0	1.6–1.9	7.4–8.1
Oxymycterus hucucha								
AM 260583, M	29.3	4.3	11.0	11.6	3.3	13.0	1.3	5.4
AM 246721, M	28.0	4.7	10.4	12.4	3.6	12.4	1.3	5.5
MVZ 119948, F	27.8	4.1	10.4	12.1	3.0	12.2	1.1	5.2
O. inca doris								
BM 2.1.1.95, M	37.5	5.5	—	—	—	16.0	—	6.6
Incachaca, AM, 2 M, 1 F	—	5.1–5.6	12.9–13.5	—	4.0–4.2	—	1.6–1.7	6.3–6.6
O. i. iris								
Estancia Cachuela Esperanza, AM, 3 M	37.2–39.8	5.7–6.1	13.0–14.8	14.3–14.8	4.6–4.9	17.2–18.2	1.7–2.0	6.3–6.8
O. paramensis jacentior								
UM 155868, F	35.1	5.4	—	14.2	—	15.4	—	6.1
UM 156096, M	33.9	5.2	—	14.1	—	14.5	—	6.4
O. p. nigrifrons								
Ñequejahuira, AM, 2 M, 3 F	32.4–34.7	4.8–5.3	11.9–12.9	13.6–14.1	4.2–4.5	15.0–15.8	1.5–1.8	6.6–7.1
UM 156093, M	34.1	5.0	—	14.4	—	14.7	—	6.8
UM 156091, M	35.2	5.1	13.6	15.3	4.0	16.3	1.5	7.2
O. p. paramensis								
BM 34.9.2.166, M	33.4	5.2	12.2	14.4	4.5	14.8	1.5	6.4
			Tribe uncertain					
Pseudoryzomys simplex								
AM 210054, M	32.1	5.2	10.3	12.8	4.6	16.3	1.7	4.4
AM 262048, F	30.7	5.0	9.4	12.8	4.5	16.2	1.6	4.1
			Tribe Phyllotini					
Andinomys e. edax								
Sama, BM, 1 M, 3 F	32.1–35.6	6.8–7.3	11.0–12.2	13.1–14.5	5.5–6.0	18.1–18.9	1.9–2.0	3.8–4.2
Auliscomys (Maresomys) b. boliviensis								
AM 262772, M	31.3	5.8	9.6	14.4	5.3	18.2	1.7	4.1
AM 262774, M	30.8	5.8	9.8	14.2	5.2	16.8	1.8	3.9
AM 262776, F	32.5	5.9	10.6	13.6	5.4	18.7	1.7	3.8

TABLE 20
(*Continued*)

	Occipito-nasal Length	Alveolar Length of Tooth Row	Length of Rostrum	Breadth of Braincase	Post-dental Breadth	Posterior Zygomatic Breadth	Breadth of M1	Inter-orbital Breadth
A. (*Auliscomys*) *pictus*								
AM 72727, F	—	5.2	8.1	12.6	4.9	15.4	1.8	4.0
AM 249016, M	30.6	5.6	9.8	13.3	4.8	17.5	1.8	4.2
A. (*A.*) *s. sublimis*								
Cochabamba, 4 M, 2 F	26.2–28.7	4.9–5.3	8.3–9.1	11.7–12.5	4.2–4.7	14.1–15.7	1.4–1.6	3.8–4.0
Calomys c. callosus								
Tarija, AM, 7	27.0 ± 1.9	4.5 ± 0.2	8.4 ± 0.6	11.4 ± 0.5	4.2 ± 0.2	14.4 ± 0.7	1.3 ± 0.1	4.1 ± 0.2
	23.9–28.8	4.3–4.7	7.5–9.2	10.7–12.1	4.0–4.6	13.2–15.3	1.2–1.4	3.8–4.3
C. laucha								
2119/6325, 5 M	18.7–19.5	3.4–3.5	5.0–5.3	9.3–9.5	3.2–3.4	9.8–10.2	0.9–1.0	3.3–3.5
C. lepidus ducillus								
Near Huancaroma, 1 M, 3 F	20.3–20.9	3.5–3.8	6.0–6.2	10.1–10.2	3.2–3.5	10.9–11.8	0.9–1.1	3.3–3.5
1 km E Iscayachi, 4 M, 2 F	21.2–22.6	3.3–3.8	6.4–7.2	9.7–10.2	3.0–3.6	11.3–11.6	1.0–1.1	3.4–3.7
C. musculinus								
AM 246798, M	21.7	3.6	6.8	9.8	3.2	11.0	1.3	2.0
AM 260666, M	21.6	3.8	6.3	10.4	3.9	11.4	1.1	3.8
AM 260670, M	21.2	3.5	5.9	10.2	3.4	11.4	1.0	3.8
C. tener								
MSB 63396, M	22.6	3.6	6.4	10.1	3.3	11.9	1.2	3.8
C. venustus								
AM 262780, M	29.9	15.9	9.8	11.6	4.5	15.9	1.3	4.9
Chinchillula sahamae								
AM 249020, F	38.8	7.3	13.3	15.4	5.6	22.4	2.2	4.9
AM 247886, M	37.6	7.7	12.6	15.3	6.0	20.9	2.3	5.0
AM 247885, F	39.4	8.2	13.3	15.2	6.0	21.6	2.3	5.1
Eligmodonta puerulus								
Oruro, BM, 3 M, 1 F	23.2–24.7	3.8–4.0	7.3–8.0	11.5–11.9	4.1–4.3	12.2–12.5	1.1–1.2	3.9–4.1
Galenomys garleppii								
AM 246945, M	30.6	5.5	10.6	14.2	4.9	17.6	1.7	4.2
AM 246946, M	29.5	5.9	10.0	14.1	4.4	16.7	1.9	4.0
AM 246947, F	29.2	5.6	10.0	13.7	4.6	16.6	1.8	4.1
AM 242814, M	27.8	5.3	9.3	12.7	4.5	15.8	1.8	3.7
Graomys domorum domorum								
Olds et al. (1987),	32.6 ± 1.2	5.1 ± 0.3	10.4 ± 0.6	14.1 ± 0.5	5.0 ± 0.2	16.4 ± 0.8	1.6 ± 0.1	5.4 ± 0.2
n = 11	30.6–34.2	4.7–5.6	9.7–11.3	13.1–14.7	4.8–5.3	14.9–17.2	1.5–1.9	5.1–5.6
G. d. taterona								
Tablada, BM, 5 M, 2 F	34.1–37.0	5.5–5.9	11.1–12.4	14.4–14.9	4.8–5.2	16.9–18.8	1.7–1.8	5.5–6.5
G. g. griseoflavus								
Olds et al. (1987),	32.9 ± 2.0	5.0 ± 0.4	10.6 ± 1.1	13.5 ± 0.6	4.9 ± 0.2	16.6 ± 1.0	1.6 ± 0.1	5.3 ± 0.4
n = 12	28.8–35.9	4.8–5.9	8.7–11.9	12.0–14.2	4.6–5.4	15.0–17.8	1.4–1.8	4.4–5.8
G. pearsoni dorbignyi								
MSB 55245, M	32.5	5.4	9.9	13.6	4.8	15.3	1.5	5.3
AM 260762, F	31.7	5.1	10.6	12.0	4.5	15.1	1.5	4.4
Neotomys e. ebriosus								
AM 72744, M	26.9	6.0	9.1	12.3	5.4	15.2	—	4.0
Pongo, AM, 5 M, 2 F	28.7–29.7	5.9–6.6	8.3–11.5	11.7–12.4	5.1–5.5	13.8–16.4	1.8–2.1	3.2–4.0
N. e. vulturnus								
BM 26.6.12.53, M	29.9	5.3	10.5	12.8	5.6	16.1	1.8	3.3
BM 26.6.12.54, M	29.0	5.5	11.0	12.6	5.0	16.2	1.8	3.3
BM 26.6.12.55, F	28.8	5.7	10.3	12.6	5.2	15.3	1.8	3.4
Phyllotis caprinus								
Yuruma, BM, 4 M, 4 F	29.8–31.5	4.9–5.4	9.2–10.3	13.1–13.6	4.0–4.6	15.0–16.0	1.6–1.8	4.2–4.6
P. chilensis								
Near Sajama, AM, 4 M, 2 F	27.4–30.0	4.9–5.6	8.9–9.9	12.7–13.8	3.9–4.2	13.3–15.3	1.4–1.6	4.0–4.4

TABLE 20
(*Continued*)

	Occipito-nasal Length	Alveolar Length of Tooth Row	Length of Rostrum	Breadth of Braincase	Post-dental Breadth	Posterior Zygomatic Breadth	Breadth of M1	Inter-orbital Breadth
P. osilae osilae								
Charazani, 5 M, 4 F	28.1–30.7	5.2–5.6	8.6–10.0	13.0–13.8	4.4–5.0	14.3–16.0	1.5–1.7	4.0–4.4
P. o. phaeus								
Pelechuco, 4 M, 2 F	28.5–30.7	5.4–5.6	8.2–9.8	13.6–14.2	4.1–4.5	14.9–16.2	1.5–1.6	3.9–4.3
P. wolffsohni								
SE Rodeo, AM, 6 M, 4 F	29.0–32.4	5.1–5.7	9.2–11.4	12.9–14.2	3.7–4.3	15.0–16.2	1.5–1.7	4.0–4.6
P. xanthopygus rupestris								
AM 255975, M old ad.	29.6	4.7	9.8	13.1	3.9	15.0	1.8	4.1
Undescribed phyllotine								
CBF 2414	37.7	6.7	11.6	14.7	5.8	18.8	1.9	5.3
AMNH 264448, M	32.7	6.6	9.75	14	5.5	16.9	1.9	4.7
			Tribe Sigmodontini					
Holochilus sciureus amazonicus								
Near Tita, AM, 2 M, 3 F	32.2–39.3	6.7–7.1	9.2–12.4	13.5–14.9	5.6–5.9	18.0–21.4	1.9–2.1	4.5–4.9

TABLE 21
Cranial Measurements (in mm) of the Hystricognathi

	Condylo-basilar Length	Condylo-incisive Length	Palatilar Length	Alveolar Molar Length	Minimum Palatal Breadth	Zygomatic Breadth	Lamb-doidal Breadth	Inter-orbital Breadth	Skull Height
				Family Erethizontidae					
Coendou bicolor simonsi									
AM 214610, F	82.1	87.0	39.2	21.6	3.1	51.6	34.2	34.1	39.4
AM 214611, F	88.8	93.6	39.2	19.0	5.8	52.6	34.8	34.6	41.9
AM 214612, F	83.6	89.0	43.0	20.6	3.7	52.0	36.9	32.5	40.8
C. prehensilis boliviensis									
AM 214613, M	87.5	92.0	40.3	20.6	8.7	53.4	39.1	35.9	45.9
AM 214614, M	106.4	107.2	52.8	21.8	7.7	58.9	41.0	36.2	51.9
				Family Chinchillidae					
Chinchilla chinchilla									
BM 98.1.8.17, F	54.0	56.4	24.2	12.7	2.2	33.8	29.9	10.4	18.2
BM 98.8.2.7, M	53.6	56.1	25.6	13.9	1.8	33.0	28.3	11.8	17.3
BM 98.8.2.10, F	50.8	52.9	23.8	13.0	1.6	30.8	28.9	10.2	16.0
Lagidium viscacia cuscus									
BM 34.9.2.101, F	77.8	81.0	38.0	19.3	1.9	45.8	32.6	17.5	22.8
FM 31671, F	75.0	77.6	37.1	21.3	2.6	41.5	30.7	17.5	21.1
L. v. cuvieri									
MVZ 164778, M	59.5	62.0	28.2	16.1	2.7	36.8	28.9	15.8	20.3
MVZ 164779, F	69.4	72.2	34.1	17.8	2.3	41.1	31.4	15.2	22.1
FM 53673, M	81.6	73.8	76.7	19.8	2.1	42.8	34.2	17.6	21.5
FM 53678, F	83.1	73.7	77.0	20.3	1.8	43.0	34.2	18.7	22.7
L. v. perlutea									
Oploca, ANSP, 3 M, 1 F	72.0–79.0	75.5–82.4	37.8–41.5	19.8–20.8	2.0–2.9	45.3–46.7	32.2–34.8	17.9–20.0	24.1–26.1
Lagostomus maximus inmollis									
LACM 27363, F	93.5	99.0	48.5	25.0	3.7	65.8	42.0	31.5	33.5
LACM 27362, F	88.4	95.4	45.7	24.9	3.5	64.1	40.9	28.7	32.7
LACM 62832, M	85.3	90.6	42.5	23.3	3.0	57.8	36.8	28.3	28.4

TABLE 21
(*Continued*)

	Condylobasilar Length	Condyloincisive Length	Palatilar Length	Alveolar Molar Length	Minimum Palatal Breadth	Zygomatic Breadth	Lambdoidal Breadth	Interorbital Breadth	Skull Height
Family Dinomyidae									
Dinomys branickii									
Zoo, AM 183828, sex ?	102.2	109.5	53.0	28.2	2.8	76.0	57.8	38.6	49.8
MACN 12961, M ad.	120.4	129.0	61.9	33.1	3.3	76.6	56.9	—	51.7
Family Caviidae Subfamily Caviinae									
Cavia tschudii nana									
BM 34.9.2.93, M	47.8	50.5	25.3	13.5	0	31.0	19.4	10.4	15.4
BM 34.9.2.95, F	45.9	48.5	22.6	12.9	0.3	29.2	19.1	9.2	14.8
AM 38712, F	46.3	50.4	23.3	12.7	2.8	29.0	19.6	10.4	16.9
AM 38713, F	47.8	52.9	23.4	12.2	2.2	29.8	19.7	10.5	16.5
Galea musteloides auceps									
BM 1.1.1.91, holotype, F	47.4	49.6	24.6	12.3	0.4	33.0	22.1	11.5	16.0
G. m. musteloides									
LACM 60667, F	44.5	46.6	22.0	11.5	0.3	28.8	18.9	11.1	14.7
FM 53647, F	43.5	46.7	22.5	13.0	0	30.1	19.5	10.3	13.6
FM 53648, F	43.7	45.9	22.6	12.6	0.8	29.6	19.4	11.6	14.5
G. spixii campicola									
CM 1974, F	51.4	—	26.0	14.7	0	32.2	21.4	13.3	17.3
CM 1976, F	48.5	—	24.0	13.3	0.7	32.4	20.9	12.8	16.8
CM 2141, F	47.9	—	23.5	13.7	0	30.7	20.7	12.8	17
Microcavia n. niata									
FM 53658, F	38.2	40.6	19.4	10.7	1.0	29.4	21.1	11.0	14.3
FM 53669, M	38.5	41.2	18.7	10.6	1.1	29.8	20.8	10.7	14.5
FM 53671, M	38.1	40.6	18.9	11.1	1.0	30.8	20.5	11.6	14.5
Subfamily Dolichotinae									
Dolichotis s. salinicola									
AM 246955, F	78.1	79.2	32.6	19.5	2.7	44.2	28.6	33.1	31.3
LACM 27369, M	72.6	76.4	—	17.1	0.8	42.5	27.8	26.4	27.4
Family Hydrochaeridae									
Hydrochaeris h. hydrochaeris									
AM 209107, F	166.4	174.9	112.8	69.3	6.1	105.8	57.6	56.5	62.6
AM 214639, F	181.3	186.8	105.6	63.4	6.3	107.0	42.0	50.4	56.3
AM 214640, F	158.0	164.3	96.0	51.4	6.8	100.4	37.2	50.0	55.5
Family Dasyproctidae									
Dasyprocta punctata boliviae									
BM 28.2.9.73, M	84.1	89.3	41.6	17.8	8.9	47.6	35.2	30.5	34.2
CM 2752, F	88.1	93.7	43.7	19.5	9.2	51.4	36.7	30.6	—
AM 61799, F	90.0	98.1	45.5	19.6	10.7	50.4	34.8	38.3	—
D. p. yungarum									
FM 96173, F	90.0	95.3	43.7	19.5	8.8	54.2	37.6	30.8	37
CM 5258, F	84.2	90.0	41.0	14.3	7.0	50.0	34.8	29.9	35.0
CM 5259, M	89.6	95.4	43.7	21.1	9.2	53.3	38.6	33.0	37.9
Family Agoutidae									
Agouti p. paca									
AM 214642, F	122.8	128.8	68.2	25.0	10.4	83.8	49.2	35.5	45.6
UM 126853, F	112.2	118.6	60.6	27.5	8.7	83.5	52.7	36.0	43
FM 21390, F	116.9	122.8	65.2	26.8	6.9	83.0	56.7	34.4	45
FM 34337, M	129.5	136.8	71.7	28.2	9.0	107.3	62.0	39.3	49

TABLE 21
(*Continued*)

	Condylobasilar Length	Condyloincisive Length	Palatilar Length	Alveolar Molar Length	Minimum Palatal Breadth	Zygomatic Breadth	Lambdoidal Breadth	Interorbital Breadth	Skull Height
			Family Octodontidae Subfamily Ctenomyinae						
Ctenomys b. boliviensis									
AM 260804, M	53.8	60.1	27.1	13.2	2.5	41.3	34.6	13.6	21.8
AM 260801, F	50.8	55.2	25.6	12.7	2.9	36.4	33.8	12.5	18.7
C. conoveri									
AM 262291, M	53.6	—	26.6	14.7	2.8	39.8	34.6	14.6	21.0
MSB 56088, M	70.0	76.4	39.4	17.0	3.6	51.5	43.7	18.8	28.9
C. f. frater									
BM 2.2.2.113	38.9	41.4	19.3	9.8	2.2	27.5	25.0	9.6	14.7
C. f. mordosus									
AM 263013, F	35.9	37.6	18.1	9.4	1.6	25.0	24.4	10.3	13.5
AM 263014, F	38.0	40.2	19.0	10.0	1.6	27.0	22.7	9.6	14.7
AM 263010, M	41.2	46.1	21.4	10.7	2.2	29.2	27.0	10.8	14.9
AM 263011, M	38.7	42.9	19.4	10.3	2.4	26.3	26.4	10.1	13.9
C. goodfellowi									
BM 20.11.17.6, M	50.2	55.9	25.2	12.9	3.0	39.3	36.1	14.5	19.7
MSB 56087, F	43.3	46.6	22.2	11.5	2.1	31.9	29.7	11.5	16.8
C. leucodon									
BM 1901.6.7.56, M	47.3	52.4	23.8	11.0	2.6	34.2	31.5	12.3	18.3
BM 13.3.18.1, sex ?	47.0	52.4	24.2	10.9	1.7	31.9	28.5	10.2	18.0
AM 263028, F	44.4	49.4	22.9	11.5	2.3	31.3	28.7	9.5	16.9
MSB 57192, F	39.2	43.2	19.1	9.6	2.2	28.4	26.2	9.2	15.3
C. lewisi									
BM 26.1.1.114, M	42.3	45.8	22.1	10.3	2.3	27.8	26.0	9.3	14.6
BM 26.1.1.116, M	47.8	47.7	25.2	11.2	2.1	32.8	29.8	12.7	17.6
BM 26.1.1.118, F	42.3	47.4	22.3	10.6	2.2	28.8	26.8	10.5	15.6
BM 26.1.1.122, F	45.2	50.7	24.5	11.6	2.0	30.8	28.9	11.9	16.9
C. minutus									
MSB 55367, M	29.2	31.9	13.8	8.0	1.9	19.7	20.6	7.1	10.8
AM 260835, F	33.3	36.0	15.7	8.8	1.7	22.8	22.2	8.5	12.4
C. opimus opimus									
Near Huancaroma, MSB, 3 M, 2 F	43.8–55.2	47.3–59.3	21.6–29.2	10.7–12.6	2.4–3.0	28.5–37.5	29.0–34.4	10.3–14.1	16.0–20.1
C. steinbachi									
AM 262297, F	48.4	53.7	24.4	12.7	2.3	36.3	33.4	15.3	19.7
AM 260853, M	47.1	51.0	22.3	12.2	2.5	32.7	31.4	13.7	18.3
			Subfamily Octodontinae						
Octodontomys gliroides									
Oruro, BM, 3 M, 2 F	37.1–41.0	39.7–44.0	15.5–18.2	8.8–9.5	1.9–2.4	22.1–24.3	18.8–20.2	9.0–10.8	12.7–14.1
			Family Abrocomidae						
Abrocoma boliviensis									
MVZ 120238, F	34.5	36.1	15.8	8.0	1.8	19.1	16.6	7.1	9.8
BM 34.9.2.171, F	38.1	39.4	16.1	8.2	1.7	18.9	18.5	7.4	10.8
A. c. cinerea									
Sama, 5 F, 5 M	39.0–47.8	40.3–49.2	18.0–22.6	9.1–10.8	1.5–2.1	19.3–23.4	20.1–22.3	7.6–8.7	11.0–13.8
			Family Echimyidae Subfamily Dactylomyinae						
Dactylomys boliviensis									
UM 126767, M	61.7	58.9	32.0	18.5	0.6	32.8	23.5	16.9	18.4
UM 127168, M	64.9	62.5	32.8	18.7	0.5	34.9	34.9	18.7	19.9
BM 1901.6.7.57, F	44.9	47.7	25.9	—	0.7	27.9	20.4	14.2	13.9

TABLE 21
(*Continued*)

	Condylobasilar Length	Condyloincisive Length	Palatilar Length	Alveolar Molar Length	Minimum Palatal Breadth	Zygomatic Breadth	Lambdoidal Breadth	Interorbital Breadth	Skull Height
				Subfamily Echymyinae					
Echimys didelphoides									
AM 210354, M yg.	32.8	34.7	15.2	8.6	0.9	19.6	17.5	9.8	12.2
AM 210355, M	43.2	45.8	20.4	11.4	2.8	24.7	24.7	13.1	13.6
Isothrix b. bistriata									
AM 210353, F	46.7	49.6	20.2	11.2	3.0	28.4	24.0	14.4	14.4
				Subfamily Eumysopinae					
Mesomys hispidus									
TTU 34988, F	34.9	37.1	13.9	6.9	1.9	21.8	18.3	9.9	11.6
Proechimys brevicauda									
AM 263054, M	39.8	42.3	18.9	9.4	2.6	24.0	19.3	10.1	12.9
AM 263055, M	45.4	48.4	21.5	9.5	3.3	27.9	21.5	13.2	13.9
AM 263056, M	48.4	51.7	21.2	9.1	2.7	28.2	23.1	12.3	14.5
AM 263057, F	41.4	44.4	19.3	9.0	3.0	25.3	20.5	11.4	13.7
P. hilda									
Peru, BM 24.2.22.12, F	50.8	53.9	22.6	8.9	2.4	29.3	24.0	13.2	10.4
P. longicaudatus									
BM 1902.1.1.100, F	—	42.8	—	8.4	2.5	25.7	20.3	10.8	10.0
BM 23.12.12.12, sex ?	43.0	46.0	20.0	9.1	3.1	27.0	20.4	10.9	11.3
CM 4967, M	41.4	—	18.7	9.0	2.6	25.1	20.5	10.4	13.6
San Ramón, AM, 3 M, 1 F	38.7–43.6	41.1–45.5	17.7–19.9	8.8–9.4	2.1–3.0	23.9–26.0	19.2–22.5	10.8–11.6	13.0–14.0
P. simonsi									
AM 249060, F	31.0	33.8	13.9	6.9	2.2	21.6	17.6	9.6	12.5
P. steerei									
Pando, Beni, AM, 2 M, 3 F	42.3–46.2	44.3–49.0	19.1–22.4	9.1–9.7	2.4–3.3	25.2–28.8	20.3–22.1	11.7–12.7	13.3–14.4
Thrichomys apereoides fosteri									
AM 260860, M yg.	28.7	30.6	11.7	5.2	1.8	19.1	17.2	9.3	11.7
AM 248463, M	43.1	44.8	18.4	10.1	3.2	28.0	20.5	12.0	13.8
				Family Myocastoridae					
Myocastor coypus popelairi									
FM 25258, F	104.3	117.7	69.3	27.8	1.4	72.6	42.2	32.1	39.6

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